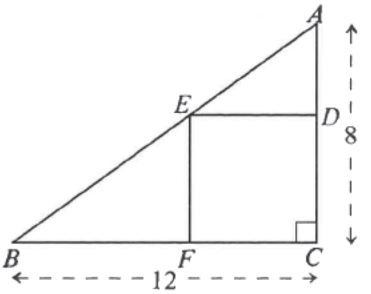
Lengths in Rectilinear Figures

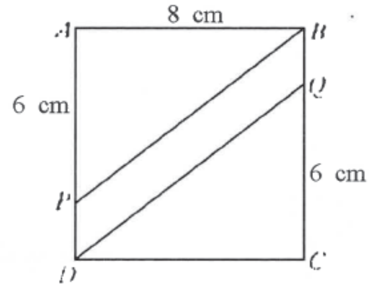
1. ABC is a triangle right-angled at C. $AC = 8$; $BC = 12$. If $CDEF$ is a square, then $ED =$



A. 3.6
B. 4
C. 4.8
D. 6
E. 6.4

[SP-CE-MATHS A2-51]

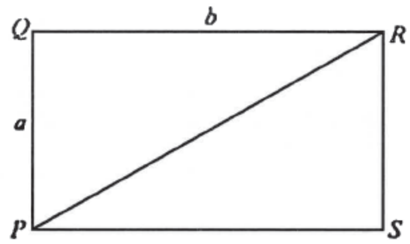
2. In the figure, $ABCD$ is a square of side 8 cm. If $AP = CQ = 6$ cm, what is the distance between the parallel lines PB and DQ?



A. 2.0 cm
B. 1.8 cm
C. 1.6 cm
D. 1.5 cm
E. 1.2 cm

[1978-CE-MATHS 2-26]

3. In the figure, $PQRS$ is a rectangle. $PQ = a$, $QR = b$. What is the distance between Q and PR?



A. $\dfrac{a^2 + b^2}{ab}$

B. $\dfrac{\sqrt{a^2 + b^2}}{ab}$

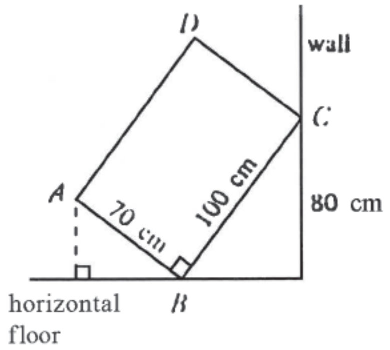
C. $\sqrt{\dfrac{a^2 + b^2}{ab}}$

D. $\sqrt{\dfrac{ab}{a^2 + b^2}}$

E. $\dfrac{ab}{\sqrt{a^2 + b^2}}$

[1978-CE-MATHS A2-53]

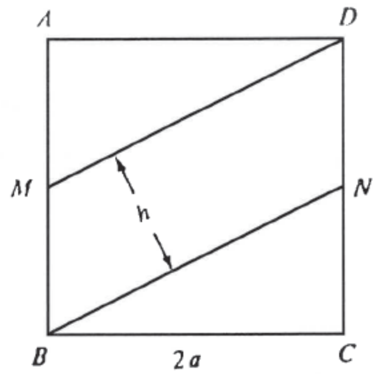
4. In the figure, $ABCD$ represents the cross-section of a rectangular box leaning against a vertical wall. $AB = 70$ cm, $BC = 100$ cm. If C is 80 cm above the floor, how high is A above the floor?



A. 38 cm
B. 40 cm
C. 42 cm
D. 45 cm
E. 56 cm

[1979-CE-MATHS 2-18]

5. In the figure, $ABCD$ is a square of side $2a$. M and N are the mid-points of AB and CD respectively. h is the height of the parallelogram $MBND$. $h =$



A. $\dfrac{1}{2}a$.

B. $\dfrac{2}{\sqrt{5}}a$.

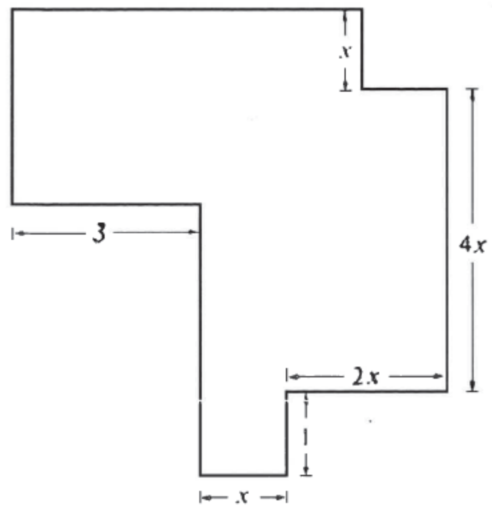
C. $\dfrac{\sqrt{5}}{2}a$.

D. $\dfrac{2}{\sqrt{3}}a$.

E. $\dfrac{\sqrt{2}}{4}a$.

[1982-CE-MATHS 2-50]

6. In the figure, all the corners are right-angled. If the perimeter of the figure is 40, then $x =$



A. 0.25

B. 2

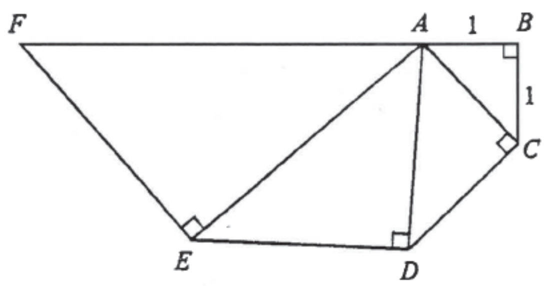
C. 2.5

D. 4

E. 4.5

[1983-CE-MATHS 2-11]

7. In the figure, ABC, ACD, ADE and AEF are right angled isosceles triangles. If $AB = BC = 1$, how long is AF?



A. $2\sqrt{5}$

B. 4

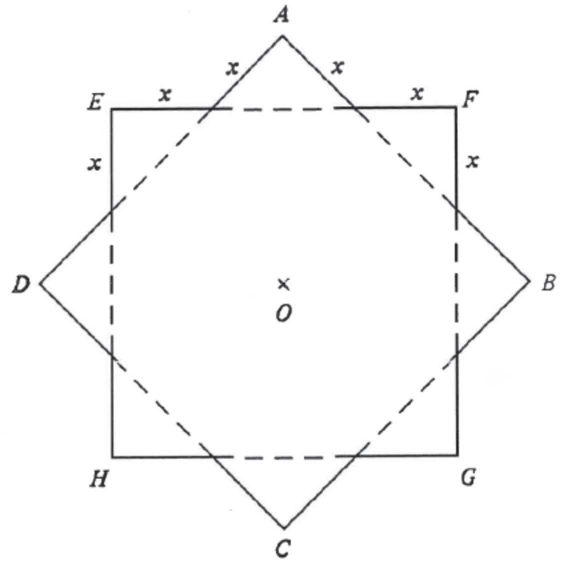
C. $2\sqrt{3}$

D. 3

E. $\sqrt{5}$

[1986-CE-MATHS 2-24]

8. In the figure, $ABCD$ and $EFGH$ are two squares of side 1. They are placed one upon the other with their centres both at O to form a star with 16 sides, each of length x. Find x.



A. $\frac{2}{7}$

B. $\frac{1}{3}$

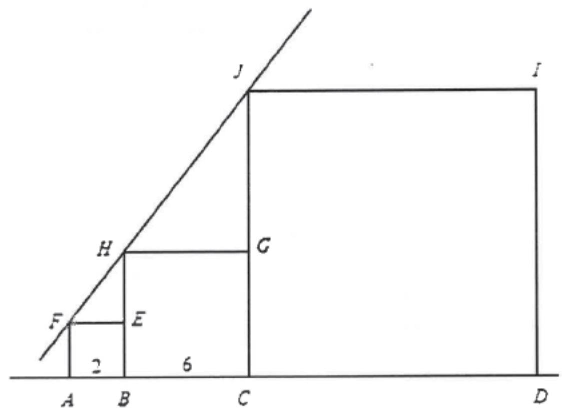
C. $\frac{2}{5}$

D. $\frac{1}{2+\sqrt{2}}$

E. $\frac{1}{1+\sqrt{2}}$

[1986-CE-MATHS 2-48]

9. In the figure, $ABEF$, $BCGH$ and $CDIJ$ are three squares. If $AB = 2$ and $BC = 6$ and F, H, J lie on a straight line, then $CD =$



A. 8 .

B. 10 .

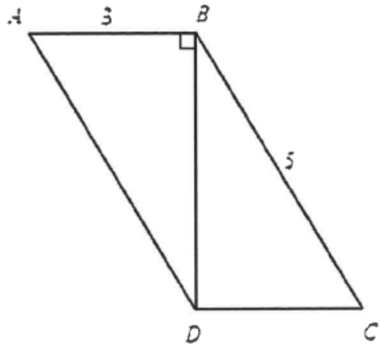
C. 12 .

D. 16 .

E. 18 .

[1988-CE-MATHS 2-25]

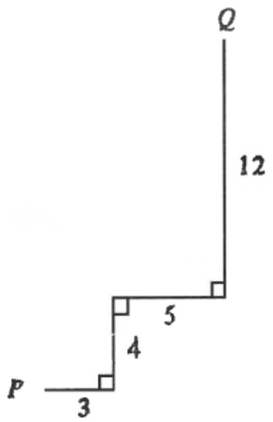
10. In the figure, $ABCD$ is a parallelogram. $AB \perp BD$, $AB = 3$ and $BC = 5$. $AC =$



A. 10 .
B. 12 .
C. $\sqrt{13}$.
D. $\sqrt{26}$.
E. $2\sqrt{13}$.

[1988-CE-MATHS 2-53]

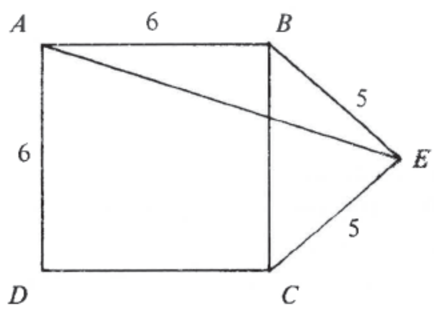
11. Referring to the figure, find the length of the line segment joining P and Q.



A. 25
B. $10\sqrt{5}$
C. 18
D. $8\sqrt{5}$
E. $\sqrt{194}$

[1989-CE-MATHS 2-22]

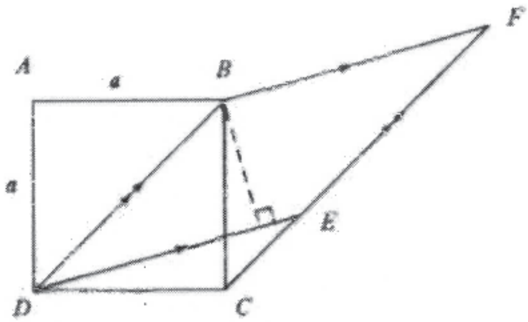
12. In the figure, $ABCD$ is a square with side 6. If $BE = CE = 5$, find AE.



A. $\sqrt{61}$
B. 9
C. 10
D. $6\sqrt{3}$
E. $\sqrt{109}$

[1992-CE-MATHS 2-25]

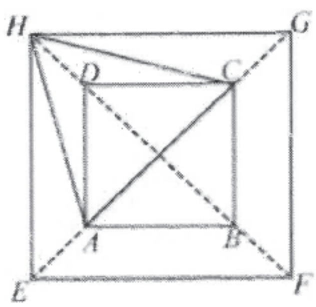
13. In the figure, $ABCD$ is a square of side a and $BDEF$ is a rhombus. CEF is a straight line. Find the length of the perpendicular from B to DE.



A. $\frac{1}{2}a$
B. $\frac{2a}{\sqrt{3}}$
C. $\frac{a}{\sqrt{2}}$
D. $\frac{\sqrt{3}}{2}a$
E. a

[1992-CE-MATHS 2-54]

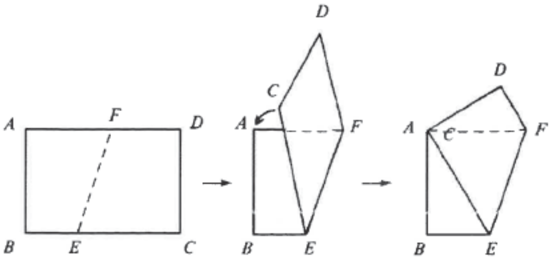
14. In the figure, $ABCD$ and $EFGH$ are two squares and ACH is an equilateral triangle. Find $AB : EF$.



A. $1 : 2$
B. $1 : 3$
C. $1 : \sqrt{2}$
D. $1 : \sqrt{3}$
E. $\sqrt{2} : \sqrt{3}$

[1993-CE-MATHS 2-52]

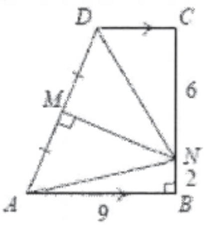
15. In the figure, a rectangular piece of paper $ABCD$ is folded along EF so that C and A coincide. If $AB = 12$ cm, $BC = 16$ cm, find BE.



A. 3.5 cm
B. 4.5 cm
C. 5 cm
D. 8 cm
E. 12.5 cm

[1993-CE-MATHS 2-53]

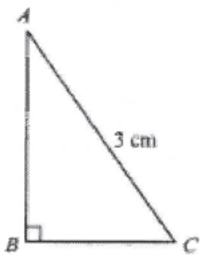
16. In the figure, $ABCD$ is a trapezium with $AB \parallel DC$, $\angle ABC = 90°$ and MN is the perpendicular bisector of AD. If $AB = 9$, $BN = 2$ and $NC = 6$, find CD.



A. $4\frac{1}{2}$
B. $6\frac{3}{4}$
C. 7
D. $\sqrt{41}$
E. $\sqrt{113}$

[1994-CE-MATHS 2-54]

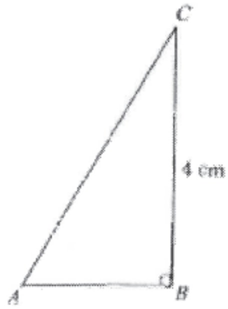
17. In the figure, $AB = 2BC$. Find BC correct to 3 significant figures.



A. 0.775 cm
B. 1.00 cm
C. 1.34 cm
D. 1.73 cm
E. 1.80 cm

[1998-CE-MATHS 2-31]

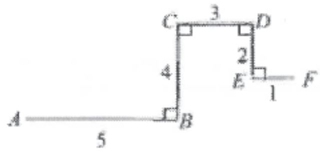
18. In the figure, $AC = 3AB$. Find AB correct to 3 significant figures.



A. 1.26 cm
B. 1.41 cm
C. 1.79 cm
D. 2.83 cm

[2002-CE-MATHS 2-25]

19. In the figure, the length of the line segment joining A and F is

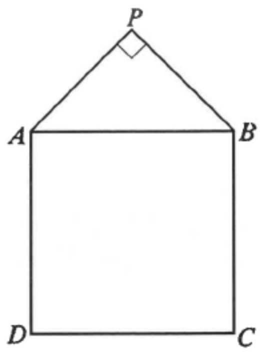


A. $\sqrt{68}$.
B. $\sqrt{77}$.
C. $\sqrt{82}$.
D. $\sqrt{85}$.

[2005-CE-MATHS 2-30]

Areas of Rectilinear Figures

20. In the figure, $ABCD$ is a square of area 16 cm^2. APB is an isosceles triangle right-angled at P. What is the area of ΔAPB?



A. 4 cm^2
B. 8 cm^2
C. $2\sqrt{2}\text{ cm}^2$
D. $4\sqrt{2}\text{ cm}^2$
E. $8\sqrt{2}\text{ cm}^2$

[SP-CE-MATHS 2-20]

21. The length of a side of a rhombus is 10 cm. If its shorter diagonal is of length 12 cm, what is the area of the rhombus in cm^2?

A. 60
B. 96
C. 100
D. 120
E. 192

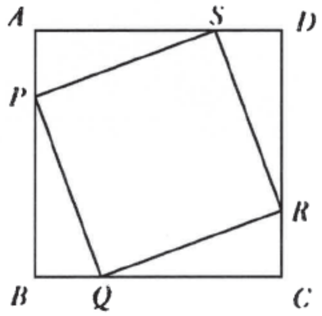
[1980-CE-MATHS 2-14]

22. What is the area, in cm^2, of an equilateral triangle of side x cm?

A. $\frac{\sqrt{3}}{4}x^2$
B. $\frac{\sqrt{3}}{2}x^2$
C. $\frac{1}{4}x^2$
D. $\frac{1}{2}x^2$
E. $\sqrt{3}x^2$

[1980-CE-MATHS 2-20]

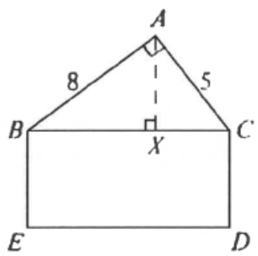
23. In the figure, $ABCD$ is a square with $AB = 5$. $AP = BQ = CR = DS = 1$. What is the area of $PQRS$?



A. 9
B. 15
C. 16
D. 17
E. 18

[1980-CE-MATHS 2-22]

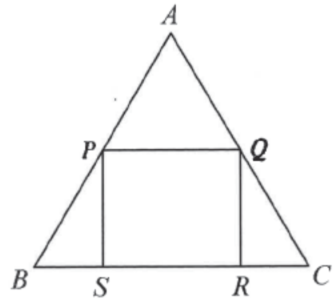
24. In the figure, $\angle BAC = 90°$, $AB = 8$, $AC = 5$ and $AX \perp BC$. $BCDE$ is a rectangle with $CD = AX$. What is the area of the rectangle $BCDE$?



A. 20
B. 40
C. 80
D. 89
E. $4\sqrt{89}$

[1981-CE-MATHS 2-40]

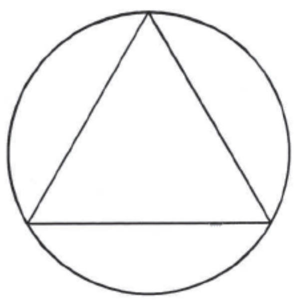
25. In the figure, ABC is an equilateral triangle of side $2a$. P and Q are the mid-points of AB and AC respectively. $PQRS$ is a rectangle. What is the area of $PQRS$?



A. a^2
B. $\frac{1}{2}a^2$
C. $\frac{2}{3}a^2$
D. $\frac{1}{\sqrt{3}}a^2$
E. $\frac{\sqrt{3}}{2}a^2$

[1981-CE-MATHS 2-50]

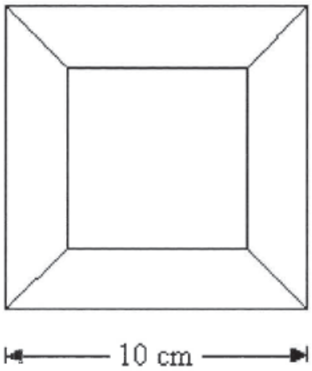
26. In the figure an equilateral triangle is inscribed in a circle of radius a. What is the area of the triangle?



A. $\frac{3}{2}a^2$
B. $\frac{3\sqrt{3}}{4}a^2$
C. $\frac{3}{4}a^2$
D. a^2
E. $\frac{3\sqrt{3}}{2}a^2$

[1982-CE-MATHS 2-39]

27. Four identical trapeziums, each of area 16 cm^2, are drawn inside a square of side 10 cm as shown in the figure. What is the height of each trapezium?



A. $\frac{1}{2}$ cm .

B. 1 cm .

C. 2 cm .

D. 3 cm .

E. 4 cm .

[1982-CE-MATHS 2-40]

28. If the lengths of the diagonals of a rhombus are 2 cm and 4 cm respectively, what is the area of the rhombus?

A. 2 cm^2

B. 4 cm^2

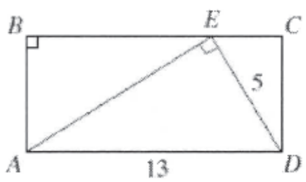
C. 8 cm^2

D. 16 cm^2

E. It cannot be determined

[1983-CE-MATHS 2-12]

29. In the figure, $ABCD$ is a rectangle. E is a point on BC such that $\angle AED = 90°$. $AD = 13$ and $DE = 5$. The area of $ABCD$ =



A. 30 .

B. 52 .

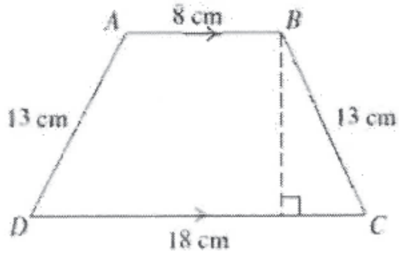
C. 60 .

D. 65 .

E. 120 .

[1985-CE-MATHS 2-51]

30. $ABCD$ is a trapezium in which $AB // DC$, $AB = 8$ cm, $DC = 18$ cm, $AD = BC = 13$ cm. Find the area of the trapezium.



A. 156 cm^2

B. 169 cm^2

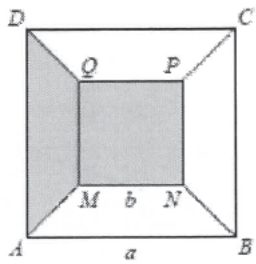
C. 216 cm^2

D. 312 cm^2

E. 338 cm^2

[1987-CE-MATHS 2-12]

31. In the figure, $ABCD$ is a square of side a and $MNPQ$ is a square of side b. The four trapeziums are identical. The area of the shaded region is



A. $\dfrac{3b^2 + a^2}{4}$.

B. $\dfrac{3b^2 - a^2}{2}$.

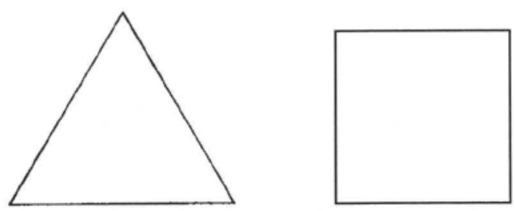
C. $\dfrac{5b^2 + a^2}{4}$.

D. $\dfrac{5b^2 - a^2}{4}$.

E. $\dfrac{(a-b)^2}{4} + b^2$.

[1991-CE-MATHS 2-12]

32. An equilateral triangle and a square have equal perimeters. $\dfrac{\text{Area of the triangle}}{\text{Area of the square}} =$



A. $\frac{9\sqrt{3}}{16}$.

B. $\frac{\sqrt{3}}{4}$.

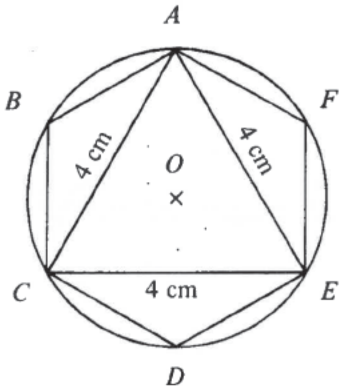
C. $\frac{\sqrt{3}}{3}$.

D. $\frac{4\sqrt{3}}{9}$.

E. 1 .

[1991-CE-MATHS 2-14]

33. In the figure, the equilateral triangle ACE of side 4 cm is inscribed in the circle. Find the area of the inscribed regular hexagon $ABCDEF$.



A. $8\sqrt{3}$ cm^2

B. $8\sqrt{2}$ cm^2

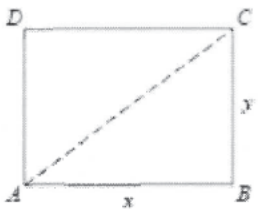
C. $4\sqrt{3}$ cm^2

D. $4\sqrt{2}$ cm^2

E. 16 cm^2

[1992-CE-MATHS 2-16]

34. In the figure, the rectangle has perimeter 16 cm and area 15 cm^2. Find the length of its diagonal AC.



A. $\sqrt{32}$ cm

B. $\sqrt{34}$ cm

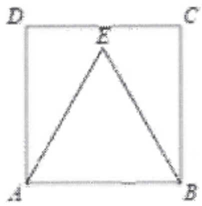
C. 7 cm

D. $\sqrt{226}$ cm

E. $\sqrt{241}$ cm

[1993-CE-MATHS 2-38]

35. In the figure, $ABCD$ is a square and ABE is an equilateral triangle. $\frac{\text{Area of } ABE}{\text{Area of } ABCD} =$



A. $\frac{1}{4}$.

B. $\frac{1}{3}$.

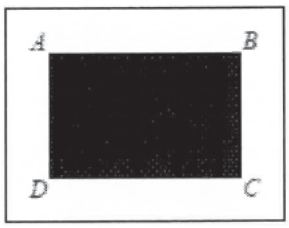
C. $\frac{\sqrt{3}}{8}$.

D. $\frac{\sqrt{3}}{4}$.

E. $\frac{\sqrt{3}}{2}$.

[1993-CE-MATHS 2-41]

36. In the figure, $ABCD$ is a rectangular field of length p metres and width q metres. The path around the field is of width 2 metres. Find the area of the path.



A. $(4p + 4q)$ m^2

B. $(2p + 2q + 4)$ m^2

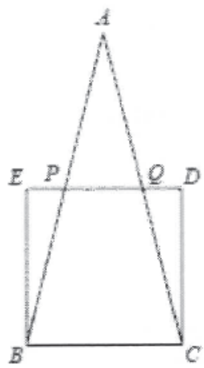
C. $(2p + 2q + 16)$ m^2

D. $(4p + 4q + 16)$ m^2

E. $(pq + 4p + 4q + 16)$ m^2

[1994-CE-MATHS 2-14]

37. In the figure, area of ΔABC : area of square $BCDE = 2 : 1$. Find $PQ : BC$.



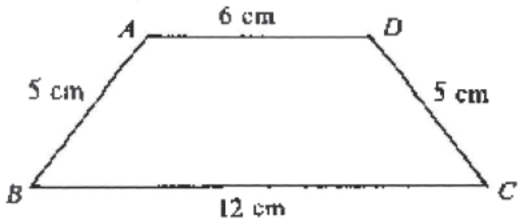
A. $1 : 2$

B. $1 : 3$

C. 1 : 4
D. 2 : 3
E. 3 : 4

[1994-CE-MATHS 2-46]

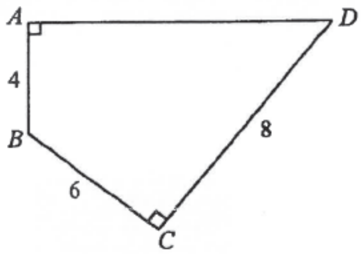
38. In the figure, $ABCD$ is a trapezium. Find its area.



A. 36 cm^2
B. 45 cm^2
C. 48 cm^2
D. 72 cm^2
E. 90 cm^2

[1995-CE-MATHS 2-14]

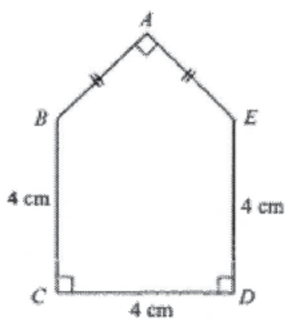
39. In the figure, the area of $ABCD$ is



A. 36 .
B. 40 .
C. 44 .
D. $4\sqrt{21} + 24$.
E. $4\sqrt{29} + 24$.

[1996-CE-MATHS 2-17]

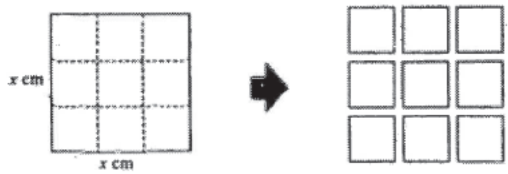
40. In the figure, find the area of the pentagon $ABCDE$.



A. 16 cm^2
B. 18 cm^2
C. 20 cm^2
D. 24 cm^2
E. 32 cm^2

[1998-CE-MATHS 2-21]

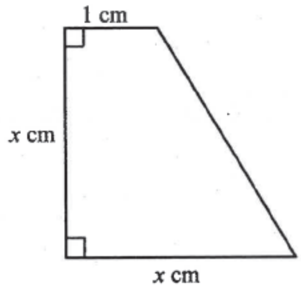
41. In the figure, a square of side x cm is cut into 9 equal squares. If the total perimeter of the 9 small squares is 72 cm more than the perimeter of the original square, then $x =$



A. 6 .
B. 8 .
C. 9 .
D. 12 .
E. 18 .

[2000-CE-MATHS 2-7]

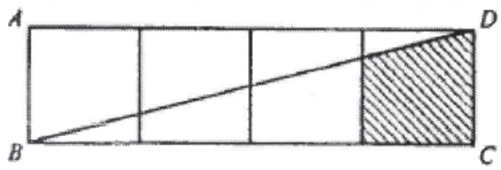
42. The figure shows a trapezium of area 6 cm^2. Find x.



A. 2
B. 3
C. 4
D. $\sqrt{6}$
E. $\sqrt{11}$

[2000-CE-MATHS 2-8]

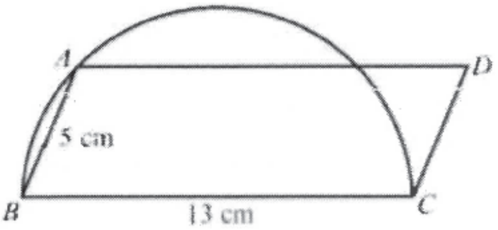
43. In the figure, $ABCD$ is a rectangle formed by four squares each of area 1 cm^2. DB is a diagonal. Find the area of the shaded region.



A. $\frac{9}{10}$ cm^2
B. $\frac{7}{8}$ cm^2
C. $\frac{5}{6}$ cm^2
D. $\frac{4}{5}$ cm^2
E. $\frac{3}{4}$ cm^2

[2000-CE-MATHS 2-12]

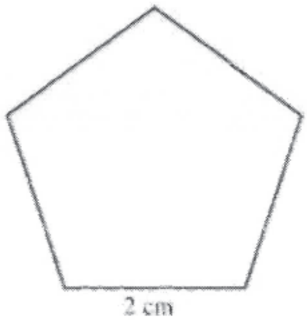
44. In the figure, CAB is a semicircle and $ABCD$ is a parallelogram. Find the area of $ABCD$.



A. 65 cm^2
B. 60 cm^2
C. 52 cm^2
D. 32.5 cm^2
E. 30 cm^2

[2000-CE-MATHS 2-31]

45. The figure shows a regular pentagon. Find its area correct to the nearest 0.01 cm^2.



A. 3.63 cm^2
B. 5.88 cm^2
C. 6.18 cm^2
D. 6.88 cm^2
E. 8.51 cm^2

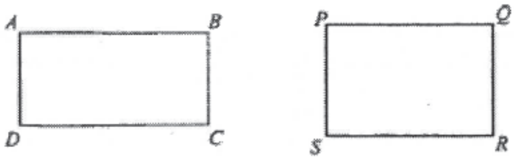
[2001-CE-MATHS 2-9]

46. The length of a side of a regular 8-sided polygon is 6 cm. Find its area, correct to 3 significant figures.

A. 27.6 cm^2
B. 29.8 cm^2
C. 66.5 cm^2
D. 174 cm^2

[2003-CE-MATHS 2-16]

47. In the figure, $ABCD$ and $PQRS$ are two rectangles of equal perimeter. If $AB : BC = 3 : 2$ and $PQ : QR = 4 : 3$, then area of $ABCD$: area of $PQRS$ =



A. $1 : 1$.
B. $1 : 2$.
C. $25 : 49$.
D. $49 : 50$.

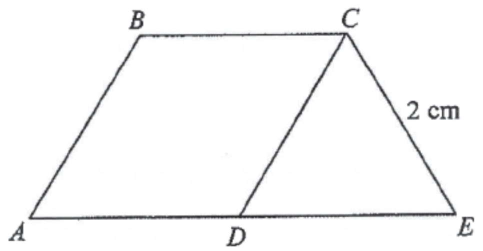
[2003-CE-MATHS 2-44]

48. If the area of a regular 10-sided polygon is 123 cm^2, find the length of the side of the 10-sided polygon. Give the answer correct to the nearest 0.1 cm.

A. 3.9 cm
B. 4.0 cm
C. 6.8 cm
D. 8.0 cm

[2004-CE-MATHS 2-19]

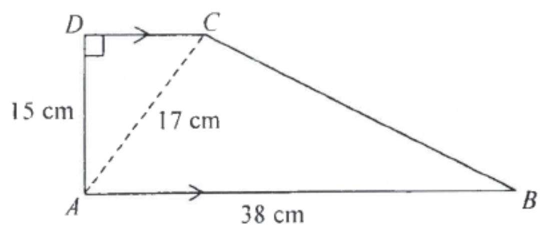
49. In the figure, $ABCD$ is a rhombus and CDE is an equilateral triangle. If ADE is a straight line, then the area of the quadrilateral $ABCE$ is



A. $2\sqrt{3}\text{ cm}^2$.
B. $3\sqrt{3}\text{ cm}^2$.
C. $4\sqrt{3}\text{ cm}^2$.
D. $6\sqrt{3}\text{ cm}^2$.

[2005-CE-MATHS 2-16]

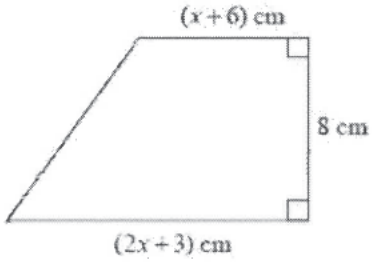
50. In the figure, the area of the trapezium $ABCD$ is



A. 345 cm^2.
B. 349 cm^2.
C. 690 cm^2.
D. 698 cm^2.

[2006-CE-MATHS 2-17]

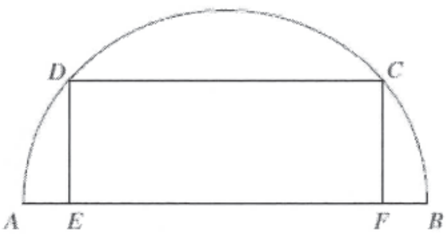
51. In the figure, the area of the trapezium is 96 cm^2. Find x.



A. 1
B. 5
C. 7
D. 11

[2009-CE-MATHS 2-7]

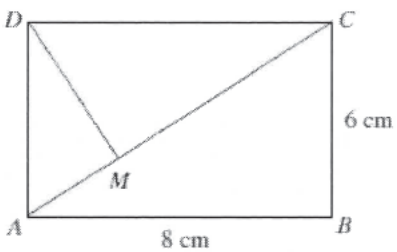
52. In the figure, $ABCD$ is a semicircle of diameter 26 cm. It is given that $CDEF$ is a rectangle such that E and F are points lying on AB. If $AE = 1$ cm, find the area of the rectangle $CDEF$.



A. 120 cm^2
B. 130 cm^2
C. 288 cm^2
D. 312 cm^2

[2010-CE-MATHS 2-20]

53. In the figure, $ABCD$ is a rectangle. If M is a point lying on AC such that DM is perpendicular to AC, then $AM : MC =$

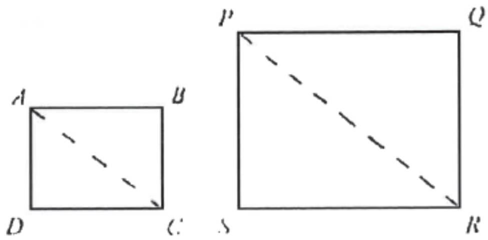


A. $3 : 4$.
B. $4 : 3$.
C. $9 : 16$.
D. $16 : 9$.

[2010-CE-MATHS 2-26]

Areas of Similar Figures

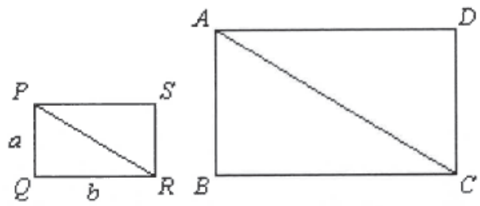
54. In the figure, $ABCD$ and $PQRS$ are similar rectangles, each representing a television screen. If AC is 40 cm and PR is 60 cm, what is the ratio of the areas of the rectangles $ABCD$ and $PQRS$?



A. $2 : 3$
B. $3 : 4$
C. $4 : 9$
D. $9 : 16$
E. It cannot be found from the information given.

[1979-CE-MATHS 2-43]

55. In the figure, the rectangles are similar. $PQ = a$, $QR = b$. If $AC = 2PR$, what is the area of $ABCD$?

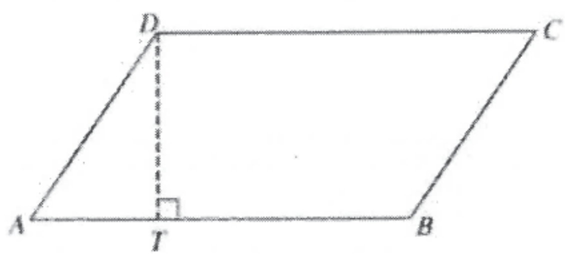


A. $2ab$
B. $4ab$
C. $2(a^2 + b^2)$
D. $2(a+b)\sqrt{a^2 + b^2}$
E. $2ab\sqrt{a^2 + b^2}$

[1982-CE-MATHS 2-43]

HKDSE Problems

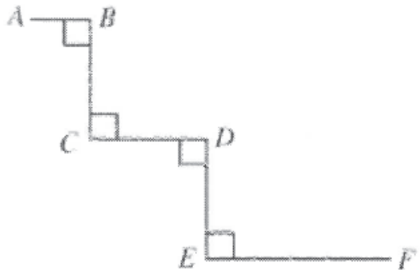
56. In the figure, $ABCD$ is a parallelogram. T is a point lying on AB such that DT is perpendicular to AB. It is given that $CD = 9$ cm and $AT : TB = 1 : 2$. If the area of the parallelogram $ABCD$ is 36 cm^2, then the perimeter of the parallelogram $ABCD$ is



A. 26 cm .
B. 28 cm.
C. 30 cm .
D. 32 cm .

[SP-DSE-MATHS 2-18]

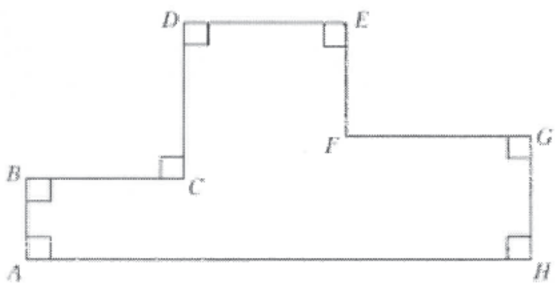
57. In the figure, $AB = 1$ cm, $BC = CD = DE = 2$ cm and $EF = 3$ cm. Find the distance between A and F correct to the nearest 0.1 cm.



A. 7.2 cm
B. 7.4 cm
C. 8.0 cm
D. 8.1 cm

[SP-DSE-MATHS 2-20]

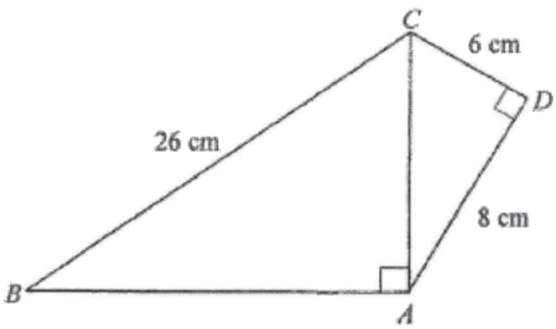
58. In the figure, $AB = 4$ cm, $BC = CD = DE = 8$ cm and $FG = 9$ cm. Find the perimeter of ΔAEH.



A. 60 cm
B. 74 cm
C. 150 cm
D. 164 cm

[PP-DSE-MATHS 2-18]

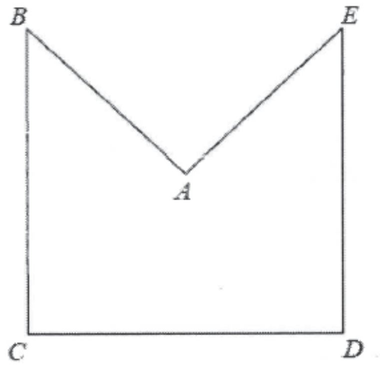
59. In the figure, the area of quadrilateral $ABCD$ is



A. 144 cm^2 .
B. 160 cm^2 .
C. 178 cm^2 .
D. 288 cm^2 .

[2012-DSE-MATHS 2-15]

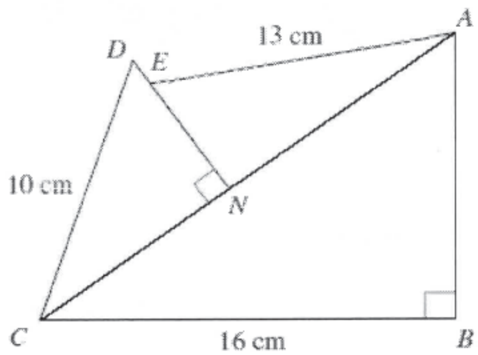
60. In the figure, $AB = AE$ and $\angle BAE = \angle BCD = \angle CDE = 90°$. If $BC = CD = DE = 16$ cm, then the area of the pentagon $ABCDE$ is



A. 71 cm^2 .
B. 128 cm^2 .
C. 192 cm^2 .
D. 224 cm^2 .

[2014-DSE-MATHS 2-15]

61. In the figure, N is a point lying on AC and E is a point lying on DN. If $DN = 6$ cm and $EN = 5$ cm, then the area of ΔABC is



A. 24 cm^2 .
B. 30 cm^2 .
C. 96 cm^2 .
D. 192 cm^2 .

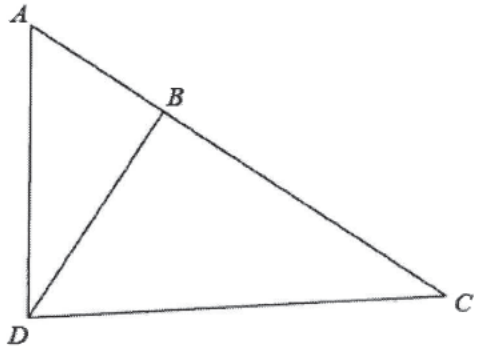
[2015-DSE-MATHS 2-15]

62. The diameters AC and BD of the circle $ABCD$ intersect at the point E. If $\angle AEB = 90°$ and $AC = 24$ cm, then the area of ΔAEB is

A. 41 cm^2 .
B. 72 cm^2 .
C. 144 cm^2 .
D. 288 cm^2 .

[2015-DSE-MATHS 2-21]

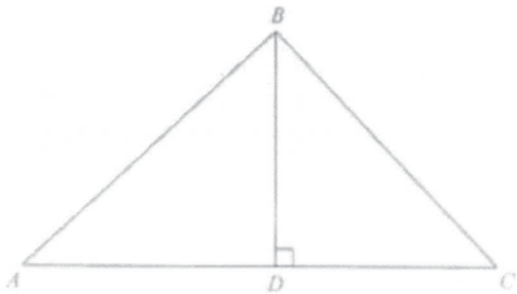
63. In the figure, ABC is a straight line. If $AB = 24$ cm, $AD = 40$ cm, $BD = 32$ cm and $CD = 68$ cm, then $BC =$



A. 43 cm .
B. 54 cm .
C. 55 cm .
D. 60 cm .

[2016-DSE-MATHS 2-16]

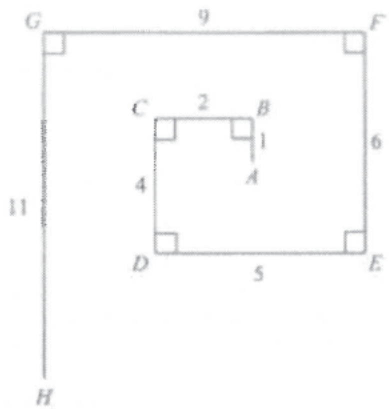
64. In the figure, D is a point lying on AC such that BD is perpendicular to AC. It is given that $AC = 14$ cm and $BD = 12$ cm. If the area of ΔABD is greater than the area of ΔBCD by 24 cm^2, then the perimeter of ΔABC is



A. 30 cm .
B. 42 cm .
C. 54 cm .
D. 84 cm .

[2017-DSE-MATHS 2-14]

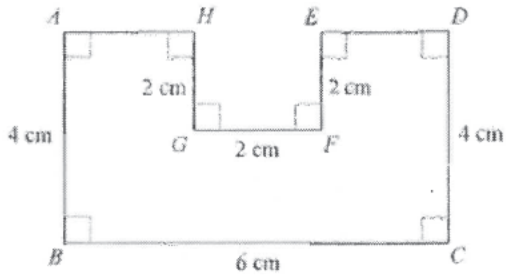
65. In the figure, the length of the line segment joining A and H is



A. 6 .
B. 8 .
C. 9 .
D. 10 .

[2017-DSE-MATHS 2-19]

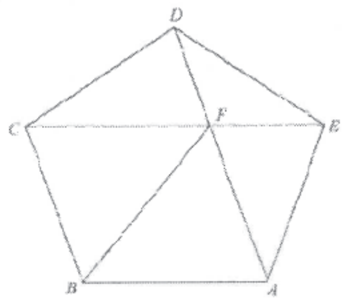
66. In the figure, $ABCDEFGH$ is an octagon, where all the measurements are correct to the nearest cm. Let x cm^2 be the actual area of the octagon. Find the range of values of x.



A. $13 < x < 23$
B. $13 < x < 27$
C. $17 < x < 23$
D. $17 < x < 27$

[2018-DSE-MATHS 2-14]

67. In the figure, $ABCDE$ is a regular pentagon. AD and CE intersect at the point F. Which of the following are true?

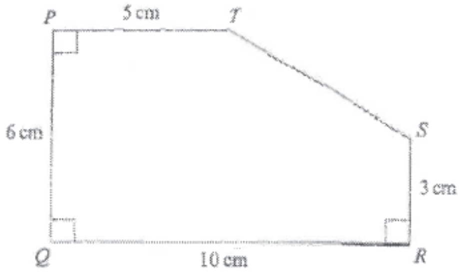


I. $CD = CF$
II. $\Delta ABF \cong \Delta CBF$
III. $\angle AFB + \angle EAF = 90°$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

[2019-DSE-MATHS 2-19]

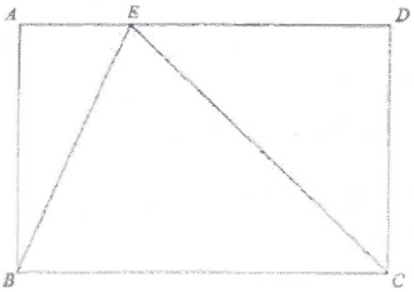
68. In the figure, $PQRST$ is a pentagon, where all measurements are correct to the nearest cm. Let $A\ cm^2$ be the actual area of the pentagon. Find the range of values of A.



A. $27.83 \leq A < 31.83$
B. $44.75 \leq A < 60.75$
C. $46.75 \leq A < 63.25$
D. $48.25 \leq A < 64.75$

[2020-DSE-MATHS 2-14]

69. In the figure, $ABCD$ is a rectangle. Let E be a point lying on AD such that $BE = 8$ cm and $CE = 15\ cm$. If $BC = 17\ cm$, find the area of the rectangle $ABCD$.



A. $60\ cm^2$
B. $68\ cm^2$
C. $120\ cm^2$
D. $136\ cm^2$

[2020-DSE-MATHS 2-21]

Definition of π

1. π is defined as

   A. $\dfrac{\text{circumference of a circle}}{\text{diameter of the circle}}$.
   B. $\dfrac{\text{area of a circle}}{\text{radius of the circle}}$.
   C. $\dfrac{22}{7}$.
   D. 3.142 .
   E. 3.1416 .

[1979-CE-MATHS 2-38]

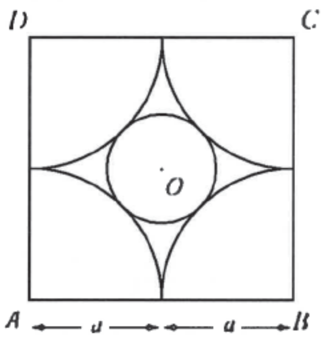
2. The real number π is

   A. $\dfrac{22}{7}$.
   B. 3.1416.
   C. the ratio of the area of a circle to the square of its diameter.
   D. the ratio of the circumference of a circle to its radius.
   E. the ratio of the circumference of a circle to its diameter.

[1987-CE-MATHS 2-22]

Lengths in Circles

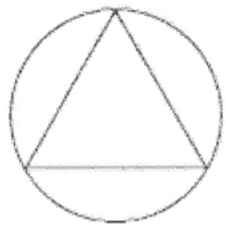
3. In the figure, $ABCD$ is a square of side $2a$. Four quadrants of radius a arc drawn with A, B, C and D as centres. If the circle with centre O touches all the four quadrants, what is the diameter of the circle O?



   A. a
   B. $\sqrt{2a}$
   C. $2\sqrt{2a}$
   D. $2(\pi-\sqrt{2})a$
   E. $2(\sqrt{2}-1)a$

[1979-CE-MATHS 2-46]

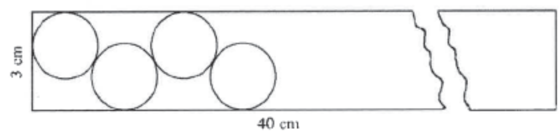
4. In the figure, an equilateral triangle is inscribed in a circle of radius 1. The circumference of the circle is greater than the perimeter of the triangle by



   A. $4\pi - 3\sqrt{3}$.
   B. $4\pi - \dfrac{3\sqrt{3}}{2}$.
   C. $2\pi - \sqrt{3}$.
   D. $2\pi - \dfrac{3\sqrt{3}}{2}$.
   E. $2\pi - 3\sqrt{3}$.

[1990-CE-MATHS 2-40]

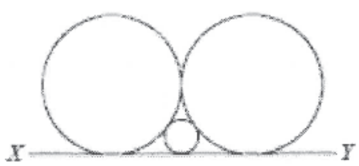
5. From a rectangular metal sheet of width 3 cm and length 40 cm, at most how many circles each of radius 1 cm can be cut?



   A. 20
   B. 21
   C. 22
   D. 23
   E. 24

[1991-CE-MATHS 2-44]

6. In the figure, the three circles touch one another. XY is their common tangent. The two larger circles are equal. If the radius of the smaller circle is 4 cm, find the radii of the larger circles.



   A. 8 cm
   B. 10 cm
   C. 12 cm
   D. 14 cm
   E. 16 cm

[1993-CE-MATHS 2-54]

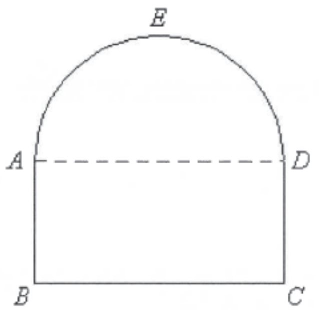
Areas of Circles

7. The area of a circle is A cm^2. Its circumference is s cm. Express s in terms of A.

   A. $s = 2\sqrt{\pi A}$
   B. $s = 2\pi\sqrt{A}$
   C. $s = \sqrt{2\pi A}$
   D. $s = \sqrt{\dfrac{A}{\pi}}$
   E. $s = \sqrt{\dfrac{2A}{\pi}}$

   [1978-CE-MATHS 2-39]

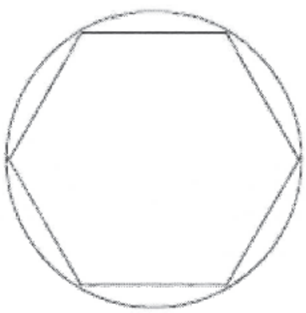
8. The perimeter of the given figure $ABCDE$ is $2(\pi + 4)$ cm. The upper portion AED is a semi-circle and the lower portion $ABCD$ is a rectangle. $AB : BC = 1 : 2$. What is the area of the given figure?



   A. 8 cm^2
   B. 2π cm^2
   C. 4π cm^2
   D. $4(\pi + 2)$ cm^2
   E. $2(\pi + 4)$ cm^2

   [1982-CE-MATHS 2-41]

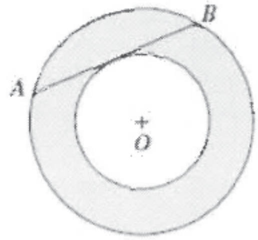
9. In the figure, a regular hexagon of side 2 cm is inscribed in a circle. The area of the circle is greater than the area of the hexagon by



   A. $(3\pi - 6)$ cm^2
   B. $(3\pi - 3\sqrt{3})$ cm^2
   C. $(4\pi - 6)$ cm^2
   D. $(4\pi - 3\sqrt{3})$ cm^2
   E. $(4\pi - 6\sqrt{3})$ cm^2

   [1985-CE-MATHS 2-16]

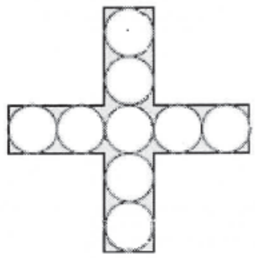
10. In the figure, O is the centre of two concentric circles. AB is tangent to the smaller circle. If $AB = 2$, find the area of the shaded part.



   A. $\dfrac{\pi}{2}$
   B. π
   C. 2π
   D. 4π
   E. It cannot be found.

   [1989-CE-MATHS 2-33]

11. In the figure, there are nine circles, each of radius 1. Find the shaded area.



   A. $9 - 9\pi$
   B. $36 - 9\pi$
   C. $40 - 9\pi$
   D. $10 - 10\pi$
   E. $40 - 10\pi$

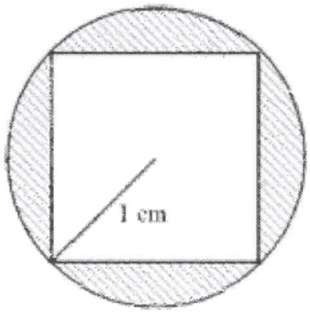
   [1990-CE-MATHS 2-13]

12. Three equal circles of radii 1 touch each other as shown in the figure, shaded area =

   A. $1 - \dfrac{\pi}{2}$.
   B. $\sqrt{3} - \dfrac{\pi}{2}$.
   C. $2\sqrt{3} - \dfrac{\pi}{2}$.
   D. $\sqrt{3} - \dfrac{\pi}{6}$.
   E. $2\sqrt{3} - \dfrac{\pi}{6}$.

   [1990-CE-MATHS 2-41]

13. In the figure, a square is inscribed in a circle with radius 1 cm. Find the area of the shaded region.



A. $(\pi - 2)$ cm^2

B. $(\pi - \sqrt{2})$ cm^2

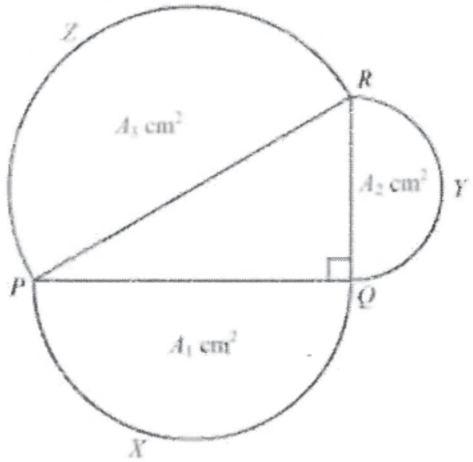
C. $(\pi - 1)$ cm^2

D. $(2\pi - 2)$ cm^2

E. $(2\pi - 1)$ cm^2

[1999-CE-MATHS 2-21]

14. In the figure, PXQ, QYR and RZP are semicircles with areas A_1 cm^2, A_2 cm^2 and A_3 cm^2 respectively. If $A_1 = 12$ and $A_2 = 5$, find A_3.



A. 13

B. 17

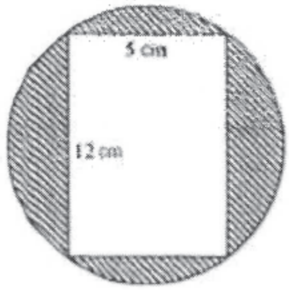
C. 169

D. 13π

E. $\frac{169}{8}\pi$

[2000-CE-MATHS 2-25]

15. The figure shows a rectangular inscribed in a circle. Find the area of the shaded region correct to the nearest 0.1 cm^2.



A. 60.0 cm^2

B. 72.7 cm^2

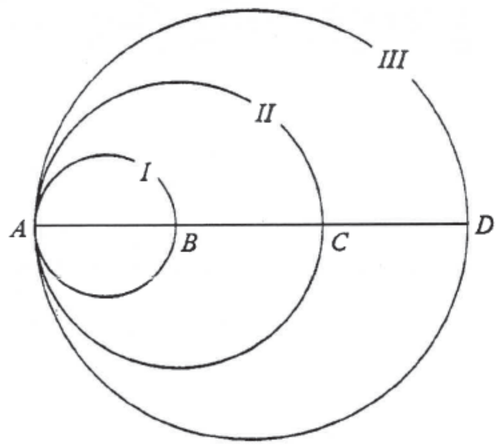
C. 132.7 cm^2

D. 470.9 cm^2

[2002-CE-MATHS 2-17]

Mensuration of Circles in Ratio

16. In the figure, $ABCD$ is a straight line with $AB = BC = CD$. Three circles I, II and III are drawn respectively on AB, AC and AD as diameters. Areas of circle I : Area of circle II : Area of circle III =



A. 1 : 2 : 3 .

B. 1 : 2 : 4 .

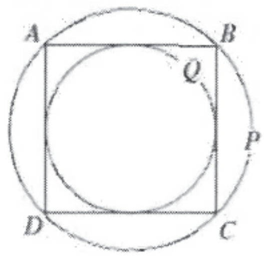
C. 1 : 4 : 9 .

D. 1 : 4 : 16 .

E. 1 : 8 : 27 .

[1986-CE-MATHS 2-10]

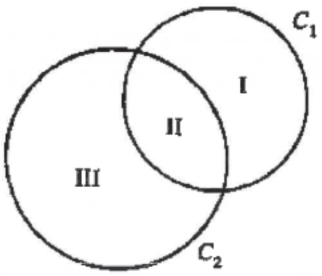
17. The figure shows the circumscribed circle P and the inscribed circle Q of the square $ABCD$. Find area of P : area of Q.



A. $\sqrt{2}:1$
B. $2:1$
C. $2\sqrt{2}:1$
D. $\pi:1$
E. $4:1$

[1988-CE-MATHS 2-46]

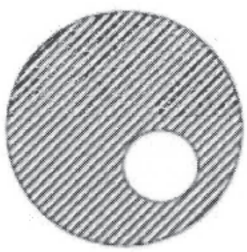
18. In the figure, C_1 and C_2 are two circles. If area of region I : area of region II : area of region III = $2:1:3$, then radius of C_1 : radius C_2 =



A. $9:16$.
B. $2:3$.
C. $3:4$.
D. $\sqrt{2}:\sqrt{3}$.
E. $\sqrt{3}:2$.

[1995-CE-MATHS 2-46]

19. In the figure, the radii of the two circles are 3 cm and 1 cm respectively. Find the ratio of the area of the shaded part to that of the smaller circle.

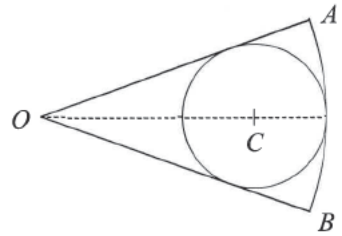


A. $2:1$
B. $3:1$
C. $4:1$
D. $8:1$
E. $9:1$

[1998-CE-MATHS 2-19]

Mensuration of Sectors

20. In the figure, a circle, centre C, of radius 1 cm is inscribed in a sector AOB of radius 3 cm. The length of arc AB =



A. $\frac{1}{2}\pi$ cm.
B. $\frac{2}{3}\pi$ cm.
C. $\frac{3}{4}\pi$ cm.
D. π cm.
E. $\frac{3}{2}\pi$ cm.

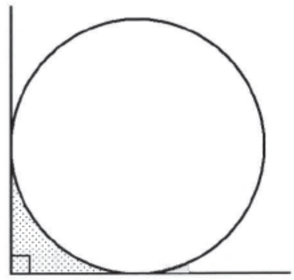
[1977-CE-MATHS 2-24]

21. The angle of a sector is 2 radians (i.e. $\frac{360°}{\pi}$) and its perimeter is 12 cm. The area of the sector is

A. 6 cm^2.
B. 9 cm^2.
C. 16 cm^2.
D. 18 cm^2.
E. 36 cm^2.

[1977-CE-MATHS 2-26*]

22. In the figure, the radius of the circle is r. The area of the shaded part is



A. $r^2 - \frac{\pi}{4}$.
B. $r(r - \frac{\pi}{4})$.
C. $r^2(1 - \frac{\pi}{4})$.
D. $r^2(1 - \pi)$.
E. $r^2(\pi - 1)$.

[SP-CE-MATHS 2-16]

23. What is the size of the angle of a circular sector whose area is 5 cm^2 and whose radius is 10 cm?

A. $\frac{9}{\pi}$ degrees

B. $\frac{18}{\pi}$ degrees

C. $\frac{90}{\pi}$ degrees

D. $\frac{360}{\pi}$ degrees

E. $\frac{900}{\pi}$ degrees

[SP-CE-MATHS 2-30*]

24. A wire of length b is bent to form the perimeter of a sector of radius r. The angle of the sector in degrees is

A. $\frac{b}{r} \times \frac{180°}{\pi}$.

B. $\frac{r}{b-r} \times \frac{180°}{\pi}$.

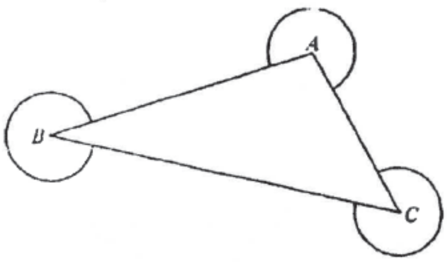
C. $\frac{r}{b-2r} \times \frac{180°}{\pi}$.

D. $\frac{b-r}{r} \times \frac{180°}{\pi}$.

E. $\frac{b-2r}{r} \times \frac{180°}{\pi}$.

[1978-CE-MATHS 2-30*]

25. In the figure, ΔABC is any triangle. Three circular arcs, with vertices as centres and radii 1 cm. What is the total length of the 3 arcs?



A. 6π cm

B. 5π cm

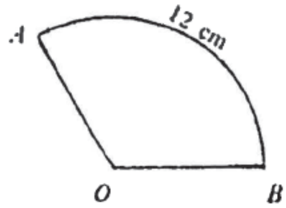
C. 4.5π cm

D. 4π cm

E. It cannot be found from the information given.

[1978-CE-MATHS 2-40]

26. The figure below shows a sector. The length of arc AB is 12 cm. If the area of the sector is 36 cm^2, then $\angle AOB =$



A. $\frac{270}{\pi}$ degrees.

B. $\frac{360}{\pi}$ degrees.

C. $\frac{450}{\pi}$ degrees.

D. $\frac{720}{\pi}$ degrees.

E. $\frac{1080}{\pi}$ degrees.

[1979-CE-MATHS 2-17*]

27. The perimeter of a sector is 16 and its angle is $\frac{360}{\pi}$ degrees. What is the area of the sector?

A. 16
B. 32
C. 64
D. 16π
E. 32π

[1980-CE-MATHS 2-41*]

28. The radius of a sector is 3 cm and the perimeter is 10 cm. What is the area of the sector?

A. 6 cm^2
B. 12 cm^2
C. 15 cm^2
D. 18 cm^2
E. 45 cm^2

[1981-CE-MATHS 2-46]

29. In a circle, the angle of a sector is 30° and the radius is 2 cm. The area of the sector is

A. 120 cm^2.

B. 60 cm^2.

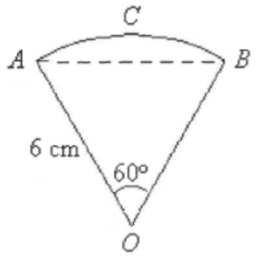
C. $\frac{30}{\pi}$ cm^2.

D. $\frac{2\pi}{3}$ cm^2.

E. $\frac{\pi}{3}$ cm^2.

[1982-CE-MATHS 2-22]

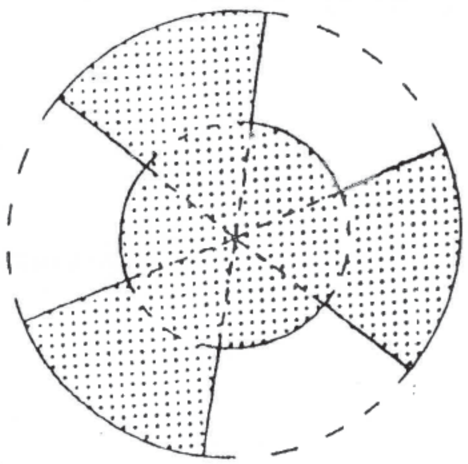
30. In the figure, $OACB$ is a sector of a circle of radius 6 cm. Arc ACB is longer than the chord AB by



A. $(\pi - 3)$ cm
B. $2(\pi - 3)$ cm
C. $3(\pi - 1)$ cm
D. $6(\pi - 1)$ cm
E. $3(2\pi - \sqrt{3})$ cm

[1982-CE-MATHS 2-23]

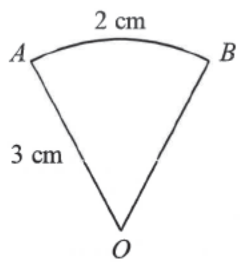
31. In the figure, the two concentric circles are of radius 2 cm and 4 cm respectively. Each circle is divided into 6 equal parts by 6 radii. What is the area of the shaded region?



A. 12π cm^2
B. 10π cm^2
C. 9π cm^2
D. 6π cm^2
E. 2π cm^2

[1982-CE-MATHS 2-42]

32. In the figure, OAB is a sector of a circle. Radius OA is 3 cm long and arc AB = 2 cm. The area of the sector is

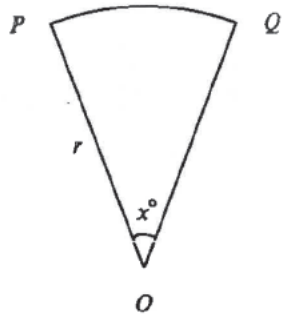


A. 3 cm^2.
B. 6 cm^2.
C. 9 cm^2.
D. 3π cm^2.
E. 6π cm^2.

[1983-CE-MATHS 2-20]

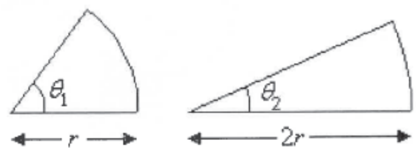
33. In the figure, the radius of the sector is r and $\angle POQ = x°$. If the area of the sector is A, then $x =$

A. $\frac{2A}{r^2}$.
B. $\frac{360A}{r^2}$.
C. $\frac{360A}{\pi r^2}$.
D. $\frac{180A}{r^2}$.
E. $\frac{180A}{\pi r^2}$.



[1984-CE-MATHS 2-47]

34. The figure shows two sectors with radii r and $2r$. If these two sectors are equal in area, then $\theta_1 : \theta_2 =$

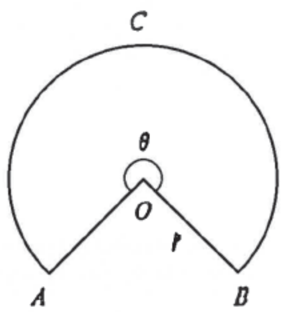


A. 2 : 1.
B. 3 : 1.
C. 4 : 1.
D. 5 : 1.
E. 6 : 1.

[1986-CE-MATHS 2-9]

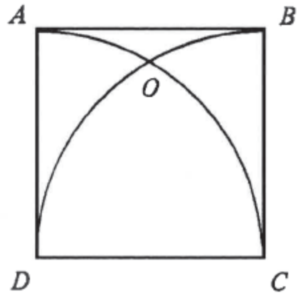
35. In the figure, if the area of the sector is x, then $\overset{\frown}{ACB} =$

A. $\frac{2x}{r}$.
B. $\frac{x}{r}$.
C. $\frac{2x}{r^2}$.
D. $\frac{\pi x}{90r}$.
E. $\frac{90x}{\pi r}$.



[1986-CE-MATHS 2-18]

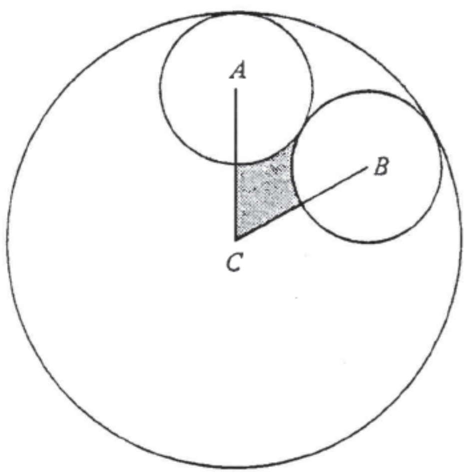
36. In the figure, $ABCD$ is a square. Arcs AC and BD are drawn with centres D and C respectively, intersecting at O. $\overset{\frown}{AO} : \overset{\frown}{OC} =$



A. $1 : \sqrt{2}$.
B. $1 : \sqrt{3}$.
C. $1 : 2$.
D. $1 : 3$.
E. $2 : 3$.

[1986-CE-MATHS 2-47]

37. Three circles, centres A, B and C touch each other as shown in the figure. The radii of the two circles with centre A and B are both 1 cm and radius of the circle with centre C is 3 cm. Find the area of the shaded part in cm^2.



A. $\sqrt{3} - \frac{\pi}{3}$
B. $\sqrt{3} - \frac{\pi}{6}$
C. $2\sqrt{3} - \frac{\pi}{3}$
D. $2\sqrt{3} - \frac{\pi}{6}$
E. It cannot be determined.

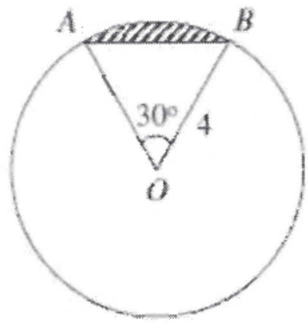
[1986-CE-MATHS 2-52]

38. The circumference of a circle is 6π cm. The length of an arc of the circle which subtends an angle of $\frac{60}{\pi}$ degrees at the centre is

A. 1 cm .
B. $\frac{3}{2}$ cm .
C. 2 cm .
D. π cm .
E. 2π cm .

[1987-CE-MATHS 2-17*]

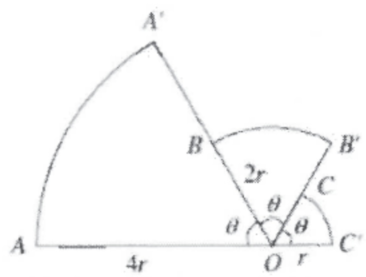
39. In the figure, O is the centre of the circle of radius 4. The area of the shaded region is



A. $\frac{4\pi}{3} - 4$.
B. $\frac{4\pi}{3} - 8$.
C. $\frac{4\pi}{3} - 4\sqrt{3}$.
D. $\frac{2\pi}{3} - 4$.
E. $\frac{8\pi}{3} - 8$.

[1987-CE-MATHS 2-52]

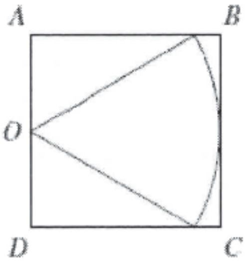
40. In the figure, AOC' is a straight line. OAA', OBB' and OCC' are 3 sectors. If $OA = 4r$, $OB = 2r$ and $OC' = r$, find the total area of the sectors in terms of r.



A. $7\pi r^2$
B. $\frac{7}{2}\pi r^2$
C. $\frac{7}{4}\pi r^2$
D. $\frac{7}{6}\pi r^2$
E. $\frac{7}{12}\pi r^2$

[1988-CE-MATHS 2-18]

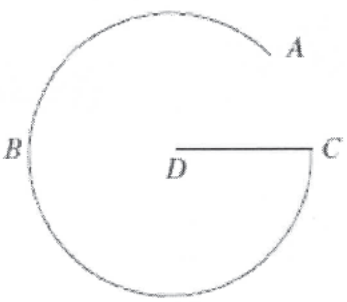
41. $ABCD$ is a square of side 2 cm. O is the mid-point of AD. A sector with centre O is inscribed in the square as shown in the figure. What is the area of the sector?



A. $\frac{\pi}{2}$ cm^2
B. $2\sqrt{3}\pi$ cm^2
C. $\sqrt{3}\pi$ cm^2
D. $\frac{2}{3}\pi$ cm^2
E. $\frac{4}{3}\pi$ cm^2

[1988-CE-MATHS 2-49]

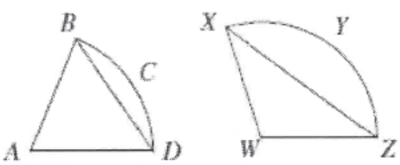
42. In the figure, $ABCD$ is a G-shaped curve, where ABC is an arc of a circle and DC is a radius. If the length of the curve $ABCD$ is the same as that of the complete circle, find the angle subtended by the arc ABC at the centre.



A. 270°
B. $(180 + \frac{180}{\pi})°$
C. 240°
D. $(360 - \frac{180}{\pi})°$
E. 315°

[1988-CE-MATHS 2-50*]

43.



In the figure, $ABCD$ and $WXYZ$ are sectors of equal radii. If $\overset{\frown}{BCD} : \overset{\frown}{XYZ} = s : t$, then which of the following is / are true?

(1) $\frac{BD}{XZ} = \frac{s}{t}$

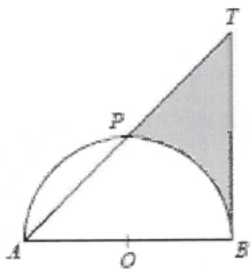
(2) $\frac{\text{area of sector } ABCD}{\text{area of sector } WXYZ} = \frac{s}{t}$

(3) $\frac{\angle BAD}{\angle XWZ} = \frac{s}{t}$

A. (1) only
B. (2) only
C. (3) only
D. (1) and (3) only
E. (2) and (3) only

[1989-CE-MATHS 2-32]

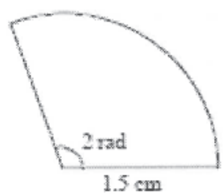
44. In the figure, TB touches the semi-circle at B. TA cuts the semi-circle at P such that $TP = PA$. If the radius of the semi-circle is 2, find the area of the shaded region.



A. $12 - \pi$
B. $8 - \pi$
C. $6 - \pi$
D. $4 - \pi$
E. $2(4 - \pi)$

[1991-CE-MATHS 2-13]

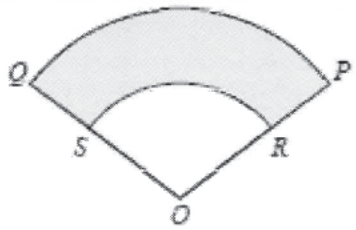
45. Find the perimeter of the sector in the figure. (π rad = 180°)



A. 2.25 cm
B. 3 cm
C. $\left(\frac{\pi}{60} + 3\right)$ cm
D. 4.5 cm
E. 6 cm

[1993-CE-MATHS 2-15]

46. In the figure, the radii of the sectors OPQ and ORS are 5 cm and 3 cm respectively, $\frac{\text{Area of shaded region}}{\text{Area of sector } OPQ} =$



A. $\frac{4}{25}$.

B. $\frac{2}{5}$.

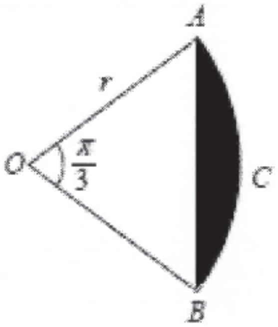
C. $\frac{9}{25}$.

D. $\frac{16}{25}$.

E. $\frac{21}{25}$.

[1993-CE-MATHS 2-42]

47. In the figure, $OACB$ is a sector of radius r. If $\angle AOB = \frac{\pi}{3}$ (i.e. 60°), find the area of the shaded part.



A. $\left(\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right)r^2$

B. $\left(\frac{\pi}{6} - \frac{1}{4}\right)r^2$

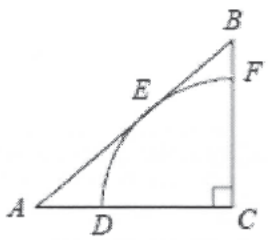
C. $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right)r^2$

D. $\left(\frac{\pi}{3} - \frac{1}{2}\right)r^2$

E. $\frac{\pi}{3}r - \frac{\sqrt{3}}{4}r^2$.

[1994-CE-MATHS 2-15]

48. In the figure, $CDEF$ is a sector of a circle which touched AB at E. If $AB = 25$ and $BC = 15$, find the radius of the sector.



A. 9

B. 10

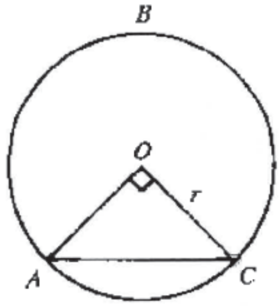
C. 11.25

D. 12

E. 12.5

[1994-CE-MATHS 2-44]

49. In the figure, O is the centre of the circle. Find the area of the major segment ABC.



A. $\frac{\pi}{4}r^2$

B. $\frac{3\pi}{4}r^2$

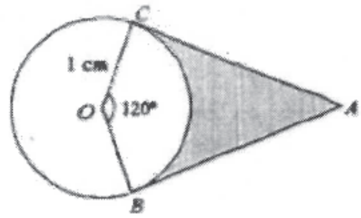
C. $\left(\frac{\pi}{4} - \frac{1}{2}\right)r^2$

D. $\left(\frac{3\pi}{4} - \frac{1}{2}\right)r^2$

E. $\left(\frac{3\pi}{4} + \frac{1}{2}\right)r^2$

[1995-CE-MATHS 2-45]

50. In the figure, O is the centre of the circle. AB and AC are tangents to the circle at B and C respectively. Area of the shaded region =



A. $(2 - \frac{\pi}{6})$ cm^2.

B. $(2 - \frac{\pi}{3})$ cm^2.

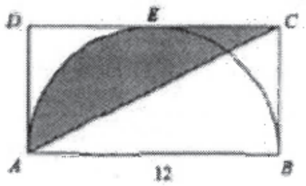
C. $(\sqrt{3} - \frac{\pi}{6})$ cm^2.

D. $(\sqrt{3} - \frac{\pi}{3})$ cm^2.

E. $(\frac{\sqrt{3}}{2} - \frac{\pi}{6})$ cm^2.

[1996-CE-MATHS 2-16]

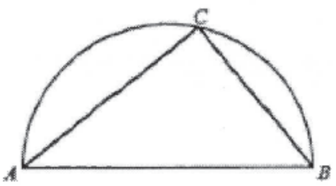
51. In the figure, BEA is a semicircle. $ABCD$ is a rectangle and DC touches the semicircle at E. Find the area of the shaded region.



A. 9π
B. 18π
C. 36π
D. $36 - 9\pi$
E. $36 + 9\pi$

[1997-CE-MATHS 2-16]

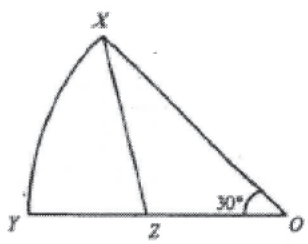
52. In the figure, BCA is a semicircle. If $AC = 6$ and $CB = 4$, find the area of the semicircle.



A. $\frac{5}{2}\pi$
B. $\frac{13}{2}\pi$
C. 10π
D. 13π
E. 26π

[1997-CE-MATHS 2-18]

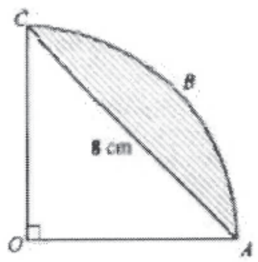
53. In the figure, OXY is a sector with centre O. If Z is the mid-point of YO, find area of ΔOXZ : area of sector OXY.



A. $1 : 2$
B. $2 : \sqrt{3}\pi$
C. $2 : 3\pi$
D. $3 : 2\pi$
E. $3\sqrt{3} : 2\pi$

[1997-CE-MATHS 2-48]

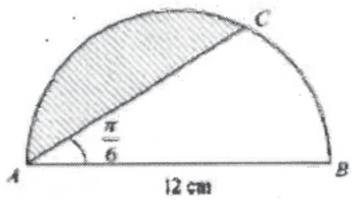
54. In the figure, $OABC$ is a sector. Find the area of the shaded region.



A. $(\pi - 2)$ cm^2
B. $(2\pi - 4)$ cm^2
C. $(4\pi - 8)$ cm^2
D. $(8\pi - 8)$ cm^2
E. $(8\pi - 16)$ cm^2

[1998-CE-MATHS 2-23]

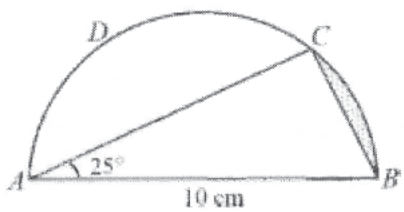
55. In the figure, ABC is a semicircle. Find the area of the shaded part.



A. 6π cm^2
B. 15π cm^2
C. $(6\pi - 9\sqrt{3})$ cm^2
D. $(6\pi + 9\sqrt{3})$ cm^2
E. $(12\pi - 9\sqrt{3})$ cm^2

[1998-CE-MATHS 2-46]

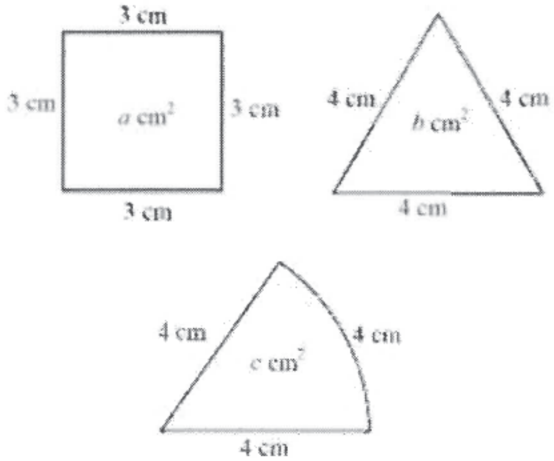
56. In the figure, $ABCD$ is a semicircle. Find the area of the shaded region correct to the nearest 0.01 cm^2.



A. 5.33 cm^2
B. 2.87 cm^2
C. 2.67 cm^2
D. 1.33 cm^2
E. 0.17 cm^2

[1999-CE-MATHS 2-25]

57. The figure shows a square, a triangle and a sector with areas a cm^2, b cm^2 and c cm^2 respectively.



Which of the following is true?

A. $a > b > c$

B. $a > c > b$

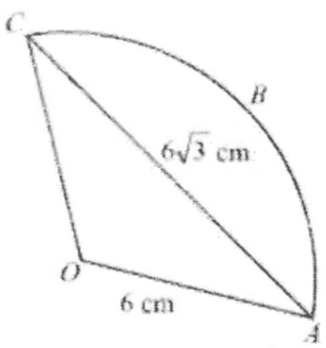
C. $b > a > c$

D. $b > c > a$

E. $c > a > b$

[2000-CE-MATHS 2-32]

58. In the figure, $OABC$ is a sector. Find the length of the arc ABC.



A. $\frac{2\pi}{3}$ cm

B. 4π cm

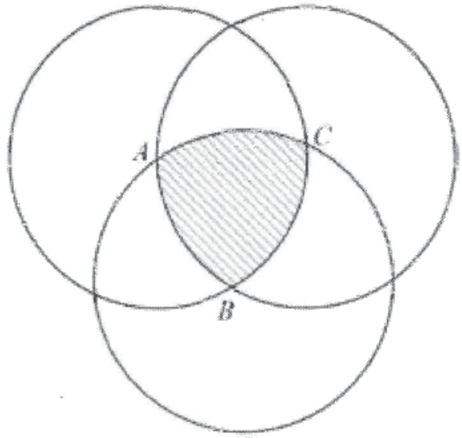
C. 5π cm

D. 6π cm

E. 12π cm

[2001-CE-MATHS 2-25]

59. In the figure, A, B and C are the centres of three equal circles, each of radius 1 cm. Find the area of the shaded region.



A. $\left(\frac{\pi}{2} - \frac{\sqrt{3}}{2}\right)$ cm^2

B. $\left(\frac{\pi}{2} - \frac{3\sqrt{3}}{4}\right)$ cm^2

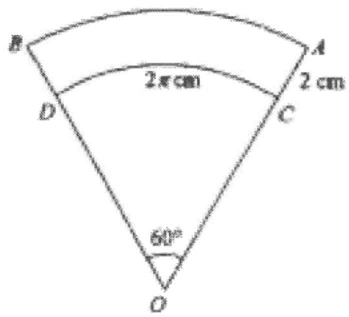
C. $\left(\frac{\pi}{2} + \frac{\sqrt{3}}{4}\right)$ cm^2

D. $\frac{\pi}{2}$ cm^2

E. $\left(\frac{\pi}{2} - \frac{\sqrt{3}}{4}\right)$ cm^2

[2001-CE-MATHS 2-26]

60. In the figure, OCD and OAB are two sectors. The length of $\overset{\frown}{AB}$ is



A. $\frac{8}{3}\pi$ cm

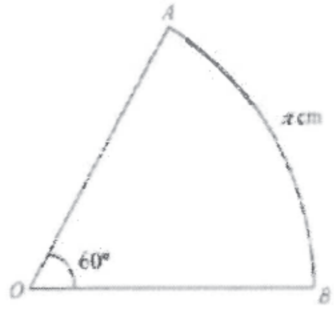
B. $\frac{10}{3}\pi$ cm

C. $(2\pi + 2)$ cm

D. 4π cm

[2002-CE-MATHS 2-20]

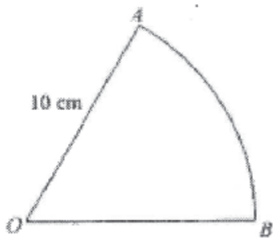
61. In the figure, OAB is a sector and $\overset{\frown}{AB} = \pi$ cm. Find the area of the sector.



A. $\frac{3}{2}\pi$ cm^2
B. 3π cm^2
C. $\frac{9}{2}\pi$ cm^2
D. 6π cm^2

[2003-CE-MATHS 2-19]

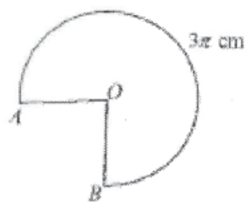
62. In the figure, OAB is a sector. The perimeter and the area of the sector are x cm and y cm^2 respectively. If $x = y$, then $\overset{\frown}{AB} =$



A. 5 cm
B. 10 cm
C. $\frac{5\pi}{3}$ cm
D. $\frac{10\pi}{3}$ cm

[2004-CE-MATHS 2-45]

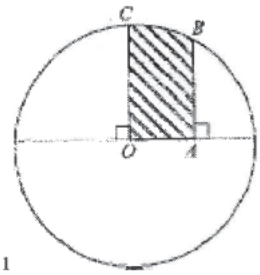
63. In the figure, OAB is a sector of radius 2 cm. If the length of $\overset{\frown}{AB}$ is 3π cm, then the area of the sector OAB is



A. $\frac{3\pi}{2}$ cm^2.
B. 3π cm^2.
C. 4π cm^2.
D. 6π cm^2.

[2005-CE-MATHS 2-19]

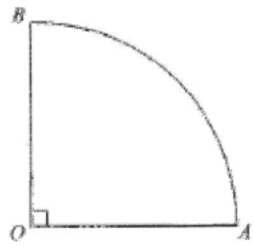
64. In the figure, O is the centre of the circle. B and C are points lying on the circle. If $OC = 2$ cm and $OA = 1$ cm, then the area of the shaded region $OABC$ is



A. $\frac{\pi}{2}$ cm^2.
B. $\frac{2\pi}{3}$ cm^2.
C. $\left(\frac{\sqrt{3}}{2} + \frac{\pi}{3}\right)$ cm^2.
D. $\left(\sqrt{3} + \frac{2\pi}{3}\right)$ cm^2.

[2006-CE-MATHS 2-19]

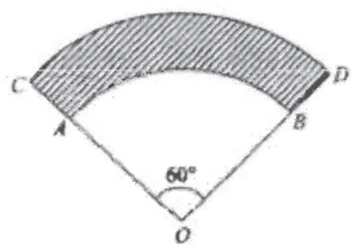
65. In the figure, OAB is a sector with centre O. If the perimeter of the sector OAB is 12 cm, find OA correct to the nearest 0.01 cm.



A. 3.36 cm
B. 3.91 cm
C. 4.31 cm
D. 7.64 cm

[2007-CE-MATHS 2-16]

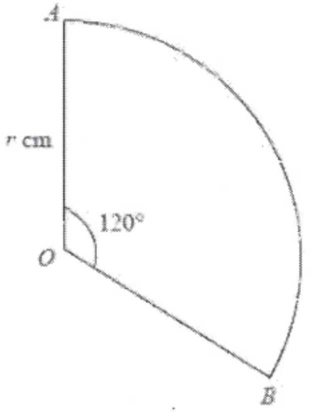
66. In the figure, OAB and OCD are sectors with centre O. It is given that the area of the shaded region $ABCD$ is 54π cm^2. If $AC = 6$ cm, then $OA =$



A. 15 cm.
B. 21 cm.
C. 24 cm.
D. 30 cm.

[2008-CE-MATHS 2-20]

67. In the figure, OAB is a sector of radius r cm. If $\angle AOB = 120°$ and the area of the sector is 12π cm^2, then $r =$



A. 3 .
B. 4 .
C. 6 .
D. 18 .

[2009-CE-MATHS 2-20]

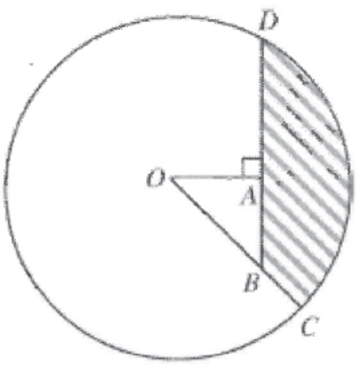
68. If the radius and the area of a sector are 12 cm and 48π cm^2 respectively, find the perimeter of the sector correct to the nearest 0.1 cm.

A. 25.1 cm .
B. 36.6 cm .
C. 49.1 cm .
D. 99.4 cm .

[2011-CE-MATHS 2-16]

HKDSE Problems

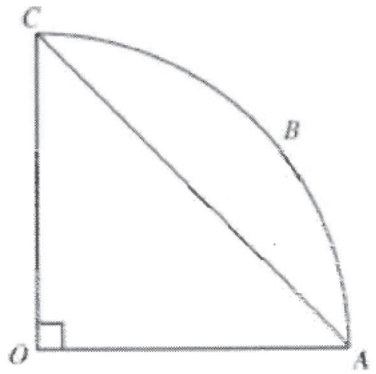
69. In the figure, O is the centre of the circle. C and D are points lying on the circle. OBC and BAD are straight lines. If $OC = 20$ cm and $OA = AB = 10$ cm, find the area of the shaded region BCD correct to the nearest cm^2.



A. 214 cm^2
B. 230 cm^2
C. 246 cm^2
D. 270 cm^2

[SP-DSE-MATHS 2-16]

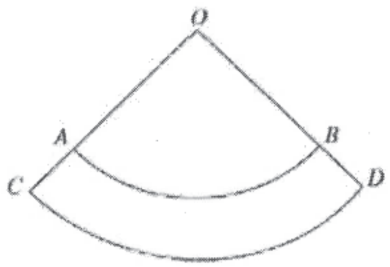
70. In the figure, O is the centre of the sector $OABC$. If the area of ΔOAC is 12 cm^2, find the area of the segment ABC.



A. $3(\pi - 2)$ cm^2
B. $3(\pi - 1)$ cm^2
C. $6(\pi - 2)$ cm^2
D. $6(\pi - 1)$ cm^2

[PP-DSE-MATHS 2-15]

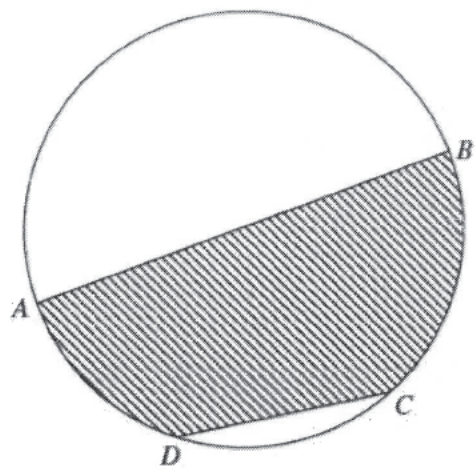
71. In the figure, OAB and OCD are sectors with centre O. If $\overset{\frown}{AB} = 12\pi$ cm, $\overset{\frown}{CD} = 16\pi$ cm and $OA = 30$ cm, then $AC =$



A. 5 cm .
B. 10 cm .
C. 20 cm .
D. 40 cm .

[2012-DSE-MATHS 2-16]

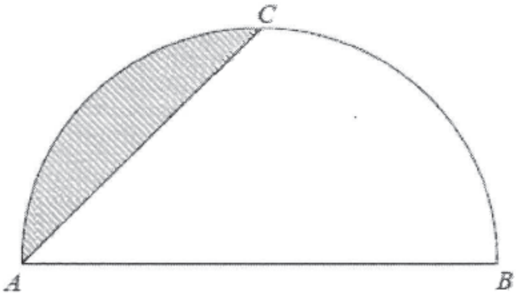
72. In the figure, AB is a diameter of the circle $ABCD$. If $AB = 12$ cm and $CD = 6$ cm, then the area of the shaded region is



A. $(12\pi - 9)\text{ cm}^2$.
B. $(12\pi + 9)\text{ cm}^2$.
C. $(12\pi - 9\sqrt{3})\text{ cm}^2$.
D. $(12\pi + 9\sqrt{3})\text{ cm}^2$.

[2012-DSE-MATHS 2-21]

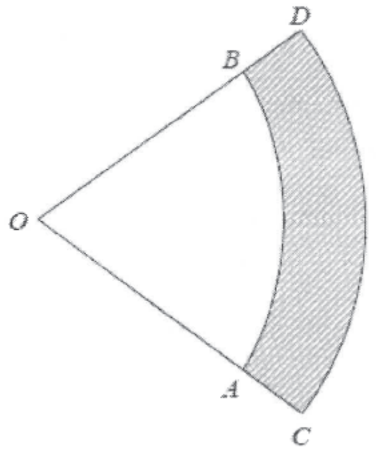
73. In the figure, the diameter of the semicircle ABC is 3 cm. If $AC = 2$ cm, find the area of the shaded region correct to the nearest 0.01 cm^2.



A. 0.23 cm^2
B. 0.52 cm^2
C. 0.64 cm^2
D. 1.07 cm^2

[2013-DSE-MATHS 2-16]

74.



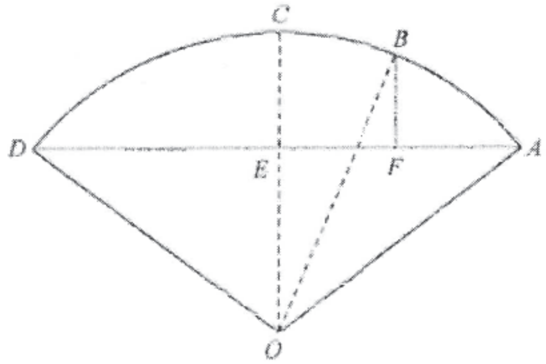
In the figure, OAB and OCD are sectors with centre O, where $OA = 33$ cm and $OC = 39$ cm. The area of the shaded region $ABDC$ is $72\pi\text{ cm}^2$. Which of the following is/are true?

(1) The angle of the sector OAB is 60°.
(2) The area of the sector OAB is $11\pi\text{ cm}^2$.
(3) The perimeter of the sector OCD is 13π cm.

A. (1) only
B. (2) only
C. (1) and (3) only
D. (2) and (3) only

[2016-DSE-MATHS 2-19]

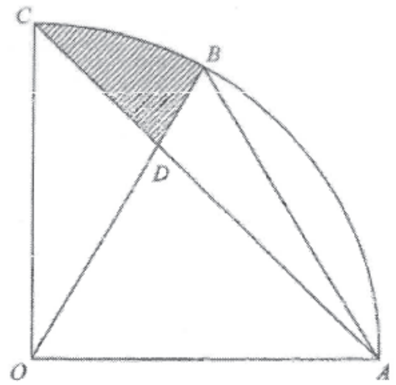
75. In the figure, O is the centre of the sector $OABCD$. AD and OC are perpendicular to each other and intersects at the point E. F is a point lying on AD such that BF is perpendicular to AD. If $AF = 9\ cm$, $DF = 39\ cm$ and $OE = 18\ cm$, then the area of the sector OBC is



A. $48\pi\ cm^2$
B. $75\pi\ cm^2$
C. $96\pi\ cm^2$
D. $150\pi\ cm^2$

[2018-DSE-MATHS 2-17]

76. In the figure, O is the centre of sector $OABC$. It is given that ΔOAB is an equilateral triangle. AC and OB intersect at the point D. If $OA = 12\ cm$ and $\angle AOC = 90°$, find the area of the shaded region BCD correct to the nearest cm^2.



A. $11\ cm^2$
B. $16\ cm^2$
C. $26\ cm^2$
D. $38\ cm^2$

[2019-DSE-MATHS 2-38]

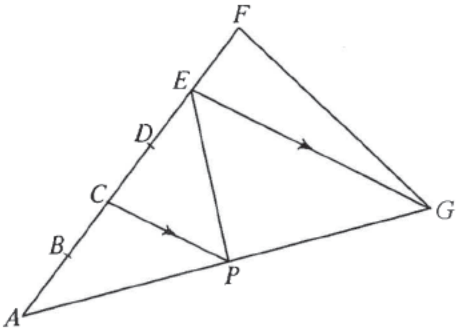
77. The angle of a sector is decreased by 60% but its radius is increased by k%. If the arc length of the sector remains unchanged, find the value of k.

A. 40
B. 60
C. 67
D. 150

[2020-DSE-MATHS 2-15]

Areas in Proportion

1. In ΔAFG, points B, C, D and E divide AF into 5 equal parts. $CP \,//\, EG$. $\dfrac{\text{Area of } \Delta APE}{\text{Area of } \Delta AGF} =$



A. $\frac{1}{2}$.

B. $\frac{1}{3}$.

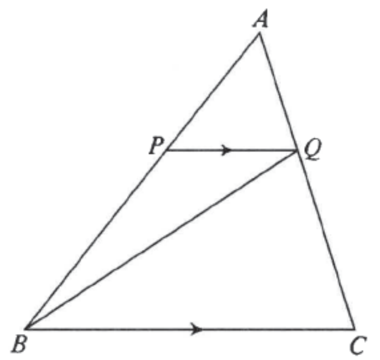
C. $\frac{2}{5}$.

D. $\frac{3}{5}$.

E. $\frac{4}{5}$.

[SP-CE-MATHS A2-50]

2. In ΔABC, $PQ \,//\, BC$. The area of ΔAPQ is 4. The area of ΔPQB is 6. What is the area of ΔQBC?



A. 8

B. 9

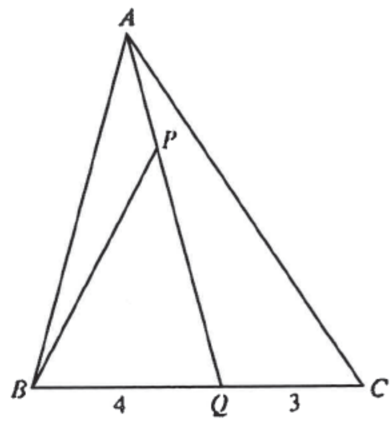
C. 10

D. 12

E. 15

[SP-CE-MATHS A2-52]

3. In the figure, $BQ : QC = 4 : 3$, and $AP : PQ = 1 : 3$. Then $\dfrac{\text{Area of } \Delta ABP}{\text{Area of } \Delta ABC} =$



A. $\frac{1}{3}$.

B. $\frac{1}{4}$.

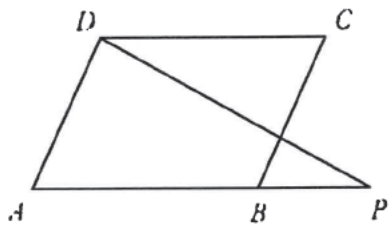
C. $\frac{1}{7}$.

D. $\frac{1}{8}$.

E. $\frac{1}{9}$.

[1978-CE-MATHS A2-54]

4. In the figure, $ABCD$ is a parallelogram. AB is produced to P such that $BP = \frac{1}{2}AB$. Then $\dfrac{\text{Area of } \Delta APD}{\text{Area of } ABCD} =$



A. $\frac{3}{4}$.

B. $\frac{2}{3}$.

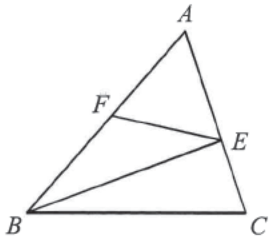
C. $\frac{1}{2}$.

D. $\frac{1}{3}$.

E. $\frac{1}{4}$.

[1979-CE-MATHS 2-44]

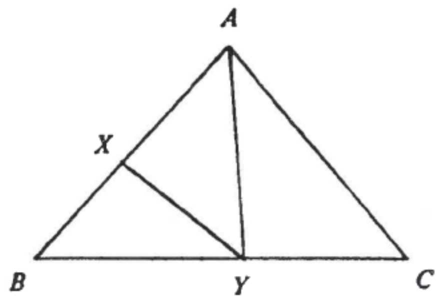
5. In the figure, F is the mid-point of AB. E is a point on AC such that $AE : EC = 2 : 1$. $\dfrac{\text{Area of } \Delta BFE}{\text{Area of } \Delta BCE} =$



A. $\frac{1}{2}$
B. $\frac{2}{3}$
C. 1
D. $\frac{3}{2}$
E. 2

[1981-CE-MATHS 2-53]

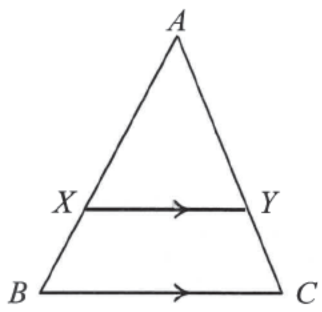
6. In the figure, X and Y are points on AB and BC respectively such that $AX : XB = 3 : 2$ and $BY : YC = 4 : 3$. If the area of $\Delta ABC = 70$, then the area of $\Delta AXY =$



A. 16 .
B. 24 .
C. 30 .
D. 40 .
E. 42 .

[1983-CE-MATHS 2-52]

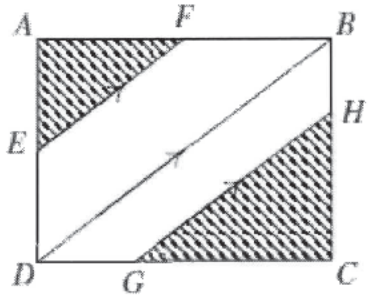
7. In the figure, $XY \parallel BC$. $AX : XB = 2 : 1$. If the area of the trapezium $BCYX = 20$, then the area of $\Delta ABC =$



A. 80 .
B. 60 .
C. 45 .
D. 40 .
E. 36 .

[1984-CE-MATHS 2-50]

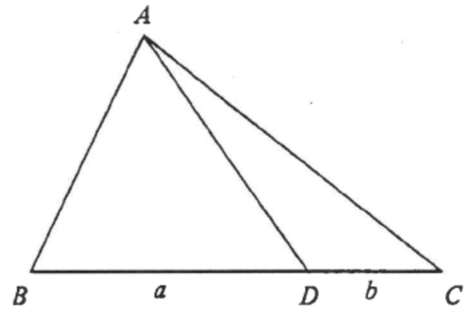
8. In the figure, $ABCD$ is a rectangle E, F, G and H are points on the four sides such that $EF \parallel DB \parallel GH$. $AF = FB$ and $HC = 2BH$. What fraction of the area of $ABCD$ is shaded?



A. $\frac{13}{36}$
B. $\frac{5}{12}$
C. $\frac{25}{36}$
D. $\frac{25}{72}$
E. $\frac{47}{72}$

[1985-CE-MATHS 2-52]

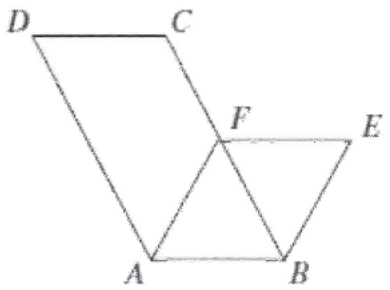
9. In the figure, $BD = a$, $DC = b$ and the area of $\Delta ABD = s$. Find the area of ΔABC.



A. $\dfrac{s(a+b)}{a}$
B. $\dfrac{s(a+b)}{b}$
C. $\dfrac{s(a+b)^2}{a^2}$
D. $\dfrac{s(a+b)^2}{b^2}$
E. $\dfrac{s(a^2+b^2)}{a^2}$

[1987-CE-MATHS 2-21]

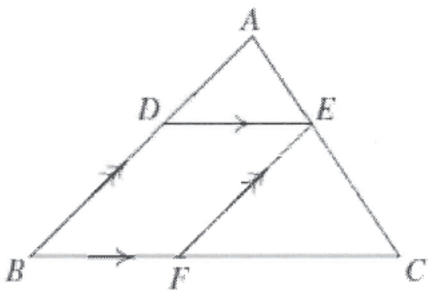
10. In the figure, $ABCD$ and $ABEF$ are parallelograms. $\dfrac{\text{Area of } ABCD}{\text{Area of } ABEF} =$



A. $\dfrac{AD}{AF}$.
B. $\dfrac{BC}{BF}$.
C. $\dfrac{BC}{EF}$.
D. $\dfrac{AD^2}{AF^2}$.
E. $\dfrac{BC^2}{EF^2}$.

[1987-CE-MATHS 2-24]

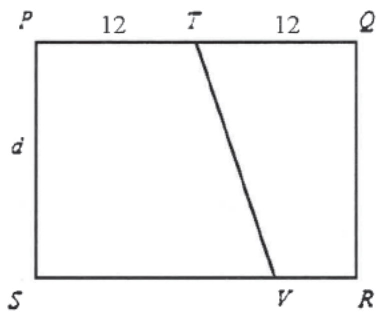
11. In the figure, $DE \,//\, BC$ and $AB \,//\, EF$. If $AE : EC = 1 : 2$, then area of ΔADE : area of parallelogram $BFED$ =



A. $1 : 2$.
B. $1 : 3$.
C. $1 : 4$.
D. $1 : 5$.
E. $1 : 6$.

[1987-CE-MATHS 2-54]

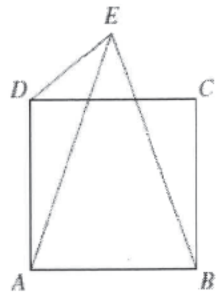
12. In the figure, $PQRS$ is a rectangle with $PQ = 24$ and $PS = d$. T is the mid-point of PQ. V is a point on SR and $\dfrac{\text{area } PTVS}{\text{area } TQRV} = 2$. $SV =$



A. 14.
B. 16.
C. 18.
D. 20.
E. 22.

[1988-CE-MATHS 2-11]

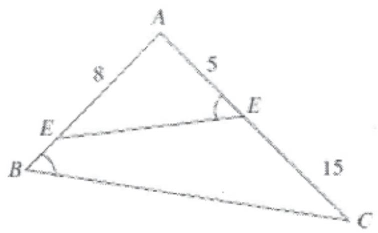
13. In the figure, $ABCD$ is a square and $AE = BE$. $\dfrac{\text{Area of } AED}{\text{Area of } ABCD} =$



A. $\dfrac{1}{2}$
B. $\dfrac{3}{8}$
C. $\dfrac{1}{3}$
D. $\dfrac{1}{4}$
E. $\dfrac{1}{8}$

[1989-CE-MATHS 2-11]

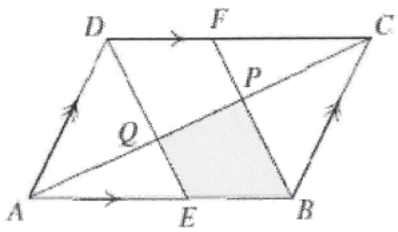
14. In the figure, D and E are points on AB and AC respectively such that $\angle ABC = \angle AED$, $AD = 8$, $AE = 5$ and $EC = 15$. If the area of ΔADE is 16, then the area of the quadrilateral $BCED$ is



A. 200.
B. 100.
C. 96.
D. 84.
E. 40.

[1989-CE-MATHS 2-37]

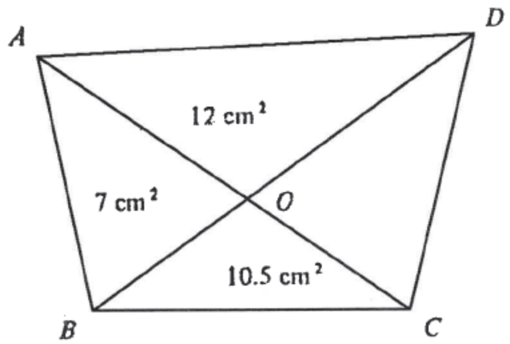
15. In the figure, $ABCD$ is a parallelogram. E and F are the mid-points of AB and DC respectively. BF and ED cut AC at P and Q respectively. If the area of $ABCD$ is 48, find the area of the shaded part.



A. 6
B. 8
C. 9.6
D. 12
E. 16

[1989-CE-MATHS 2-53]

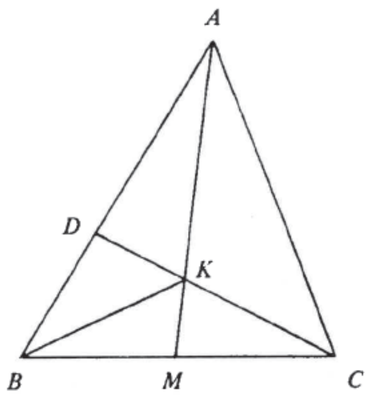
16. In the figure, AC cuts BD at O. The areas of ΔAOB, ΔAOD and ΔBOC are 7 cm^2, 12 cm^2 and 10.5 cm^2 respectively. Find the area of ΔOCD.



A. 5.5 cm^2
B. 8 cm^2
C. 8.5 cm^2
D. 15.5 cm^2
E. 18 cm^2

[1989-CE-MATHS 2-54]

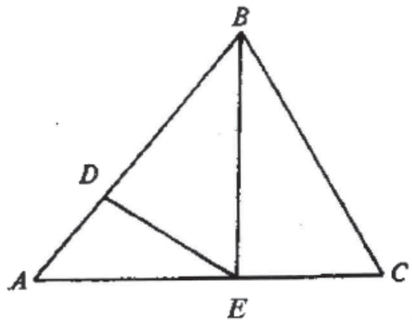
17. In the figure, M is the mid-point of BC and $AD = 2DB$. AM and CD intersect at K. Find $\dfrac{\text{area of } \Delta ADK}{\text{area of } \Delta AKC}$.



A. $\frac{1}{2}$
B. $\frac{2}{3}$
C. $\frac{3}{4}$
D. $\frac{4}{5}$
E. 1

[1991-CE-MATHS 2-53]

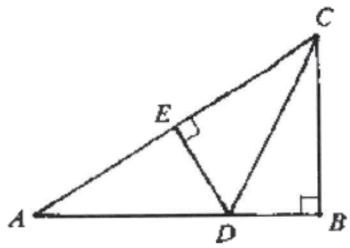
18. In the figure, $AD : DB = 1 : 2$, $AE : EC = 3 : 2$. Area of ΔBDE : Area of ΔABC =



A. 1 : 3 .
B. 2 : 5 .
C. 3 : 4 .
D. 4 : 25 .
E. 36 : 65 .

[1994-CE-MATHS 2-45]

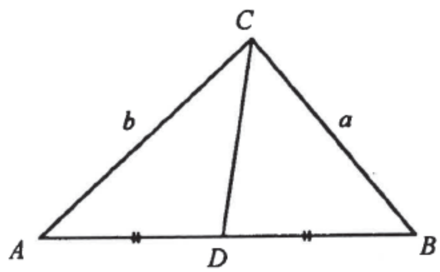
19. In the figure, $DE = DB$, $AC = 13$ and $BC = 5$. Area of ΔADE : Area of ΔACB =



A. 64 : 169 .
B. 5 : 13 .
C. 4 : 9 .
D. 8 : 13 .
E. 2 : 3 .

[1995-CE-MATHS 2-47]

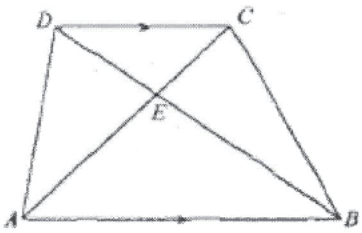
20. In the figure, area of ΔACD : area of ΔBCD =



A. $1:1$.
B. $a:b$.
C. $b:a$.
D. $a^2:b^2$.
E. $b^2:a^2$.

[1996-CE-MATHS 2-15]

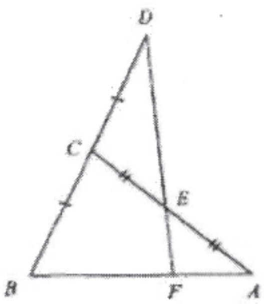
21. In the figure, if $\frac{\text{Area of triangle } CDE}{\text{Area of triangle } BCE} = \frac{1}{2}$, find $\frac{\text{Area of triangle } CDE}{\text{Area of trapezium } ABCD}$.



A. $\frac{1}{10}$
B. $\frac{1}{9}$
C. $\frac{1}{8}$
D. $\frac{1}{7}$
E. $\frac{1}{6}$

[1996-CE-MATHS 2-46]

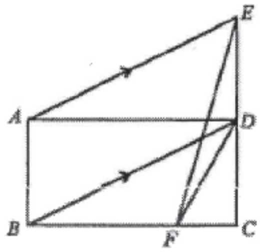
22. In the figure, $DE:EF =$



A. $1:1$.
B. $2:1$.
C. $3:1$.
D. $3:2$.
E. $4:1$.

[1996-CE-MATHS 2-52]

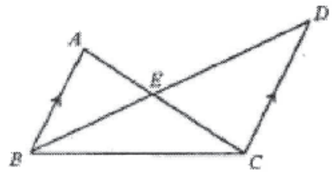
23. In the figure, $ABCD$ is a rectangle. CDE is a straight line and $AE \mathbin{//} BD$. If the area of $ABCD$ is 24 and F is a point on BC such that $BF:FC = 3:1$, find the area of ΔDEF.



A. 2
B. 3
C. 4
D. 6
E. 8

[1997-CE-MATHS 2-53]

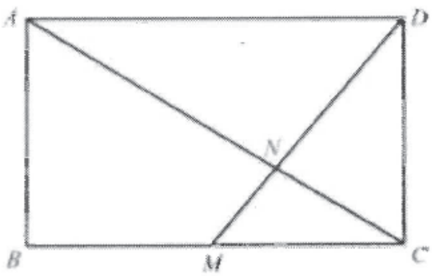
24. In the figure, $AB \mathbin{//} DC$. If the areas of ΔABE and ΔCDE are 4 and 9 respectively, find the area of ΔBCE.



A. 4
B. 5
C. 6
D. 6.5
E. 9

[1997-CE-MATHS 2-54]

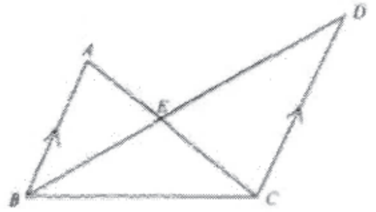
25. In the figure, $ABCD$ is a rectangle. M is the midpoint of BC and AC intersects MD at N. Area of ΔNCD : area of $ABMN$ =



A. $1:2$.
B. $1:3$.
C. $2:3$.
D. $2:5$.
E. $4:7$.

[1999-CE-MATHS 2-54]

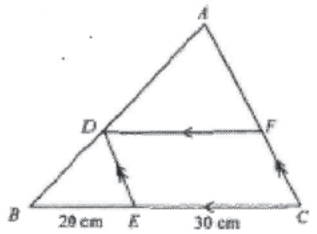
26. In the figure, AEC and BED are straight lines. If the area of $\Delta ABE = 4\text{ cm}^2$ and the area of $\Delta BCE = 5\text{ cm}^2$, find the area of ΔCDE.



A. 4.5 cm^2
B. 5 cm^2
C. 6 cm^2
D. 6.25 cm^2
E. 9 cm^2

[2000-CE-MATHS 2-54]

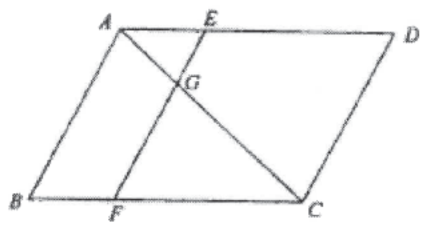
27. In the figure, ADB, BEC and CFA are straight lines. If the area of ΔABC is 225 cm^2, find the area of the parallelogram $DECF$.



A. 81 cm^2
B. 108 cm^2
C. 126 cm^2
D. 135 cm^2
E. 162 cm^2

[2001-CE-MATHS 2-50]

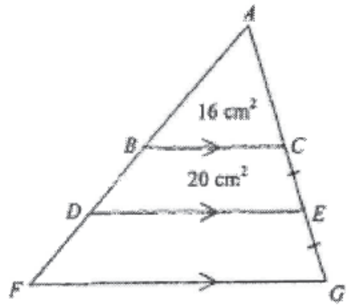
28. In the figure, $ABCD$ is a parallelogram. E and F are points on AD and BC respectively such that $AB \parallel EF$. EF meets AC at G. If $AG : GC = 1 : 2$, then area of $ABFG$: area of $EGCD$ =



A. $1 : 2$.
B. $1 : 4$.
C. $3 : 4$.
D. $5 : 8$.

[2002-CE-MATHS 2-44]

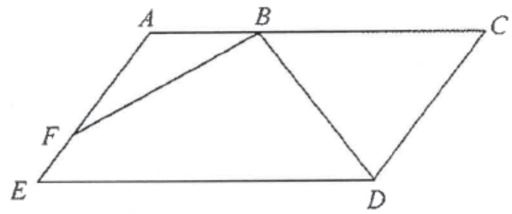
29. In the figure, $ABDF$ and $ACEG$ are straight lines. If the area of ΔABC is 16 cm^2 and the area of quadrilateral $BDEC$ is 20 cm^2, then the area of quadrilateral $DFGE$ is



A. 24 cm^2 .
B. 28 cm^2 .
C. 36 cm^2 .
D. 44 cm^2 .

[2003-CE-MATHS 2-17]

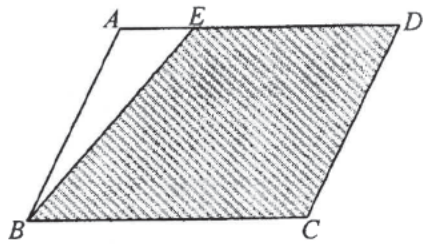
30. In the figure, $AEDC$ is a parallelogram. If $AB : BC = 1 : 2$ and $AF : FE = 2 : 1$, then the area of ΔABF : area of ΔBCD =



A. $1 : 2$.
B. $1 : 3$.
C. $1 : 4$.
D. $2 : 9$.

[2003-CE-MATHS 2-18]

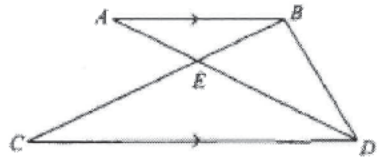
31. In the figure, $ABCD$ is a parallelogram and E is a point on AD such that $AE : ED = 1 : 3$. If the area of ΔABE is 3 cm^2, then the area of the shaded region is



A. 9 cm^2 .
B. 15 cm^2 .
C. 21 cm^2 .
D. 24 cm^2 .

[2004-CE-MATHS 2-17]

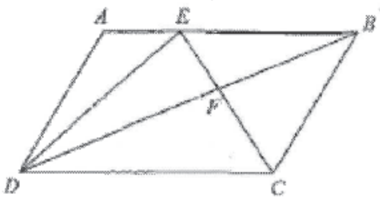
32. In the figure, AD and BC meet at E. If $CE : EB = 3 : 1$, then area of ΔABD : area of ΔCDE =



A. $1 : 1$.
B. $1 : 3$.
C. $2 : 3$.
D. $4 : 9$.

[2004-CE-MATHS 2-18]

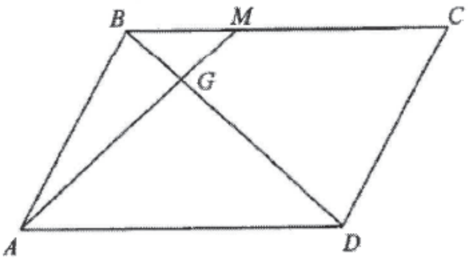
33. In the figure, $ABCD$ is a parallelogram. E is a point lying on AB. If EC and BD intersect at F, then the ratio of the area of ΔDEF to the area of ΔCBF is



A. $1 : 1$.
B. $1 : 2$.
C. $2 : 1$.
D. $2 : 3$.

[2007-CE-MATHS 2-19]

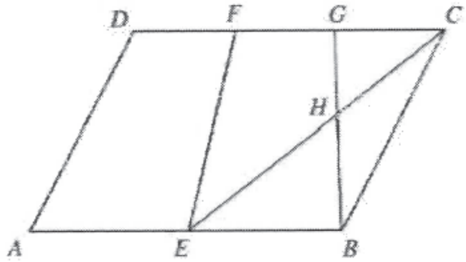
34. In the figure, $ABCD$ is a parallelogram. M is a point lying on BC such that $BM : MC = 1 : 2$. If BD and AM intersect at G and the area of ΔBGM is 1 cm^2, then the area of the parallelogram $ABCD$ is



A. 9 cm^2 .
B. 11 cm^2 .
C. 12 cm^2 .
D. 24 cm^2 .

[2008-CE-MATHS 2-21]

35. In the figure, $ABCD$ is a parallelogram. E is the mid-point of AB. F and G are points lying on CD such that $DF = FG = GC$. BG and CE intersect at H. If the area of ΔBCH is 6 cm^2, then the area of the quadrilateral $EFGH$ is

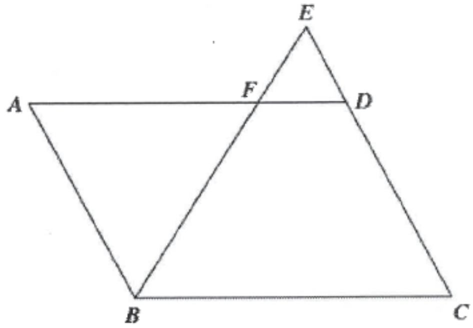


A. 10 cm^2 .
B. 12 cm^2 .
C. 15 cm^2 .
D. 16 cm^2 .

[2011-CE-MATHS 2-19]

HKDSE Problems

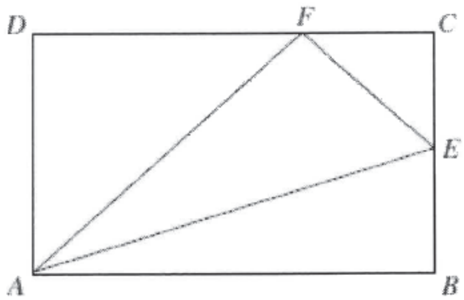
36. In the figure, $ABCD$ is a parallelogram. F is a point lying on AD. BF produced and CD produced meet at E. If $CD : DE = 2 : 1$, then $AF : BC$ =



A. $1 : 2$.
B. $2 : 3$.
C. $3 : 4$.
D. $8 : 9$.

[SP-DSE-MATHS 2-23]

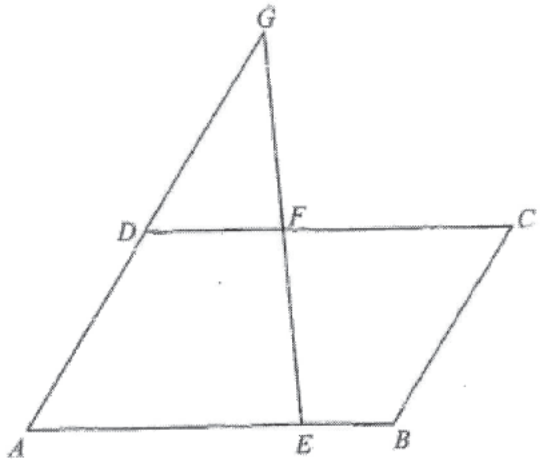
37. In the figure, $ABCD$ is a rectangle. E is the mid-point of BC. F is a point lying on CD such that $DF = 2CF$. If the area of ΔCEF is 1 cm^2, then the area of ΔAEF is



A. 2 cm^2 .
B. 3 cm^2 .
C. 4 cm^2 .
D. 6 cm^2 .

[PP-DSE-MATHS 2-17]

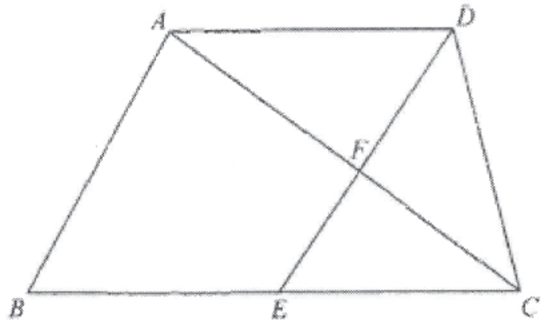
38. In the figure, $ABCD$ is a parallelogram. E and F are points lying on AB and CD respectively. AD produced and EF produced meet at G. It is given that $DF : FC = 3 : 4$ and $AD : DG = 1 : 1$. If the area of ΔDFG is $3\ \text{cm}^2$, then the area of the parallelogram $ABCD$ is



A. $12\ \text{cm}^2$.
B. $14\ \text{cm}^2$.
C. $18\ \text{cm}^2$.
D. $21\ \text{cm}^2$.

[2012-DSE-MATHS 2-17]

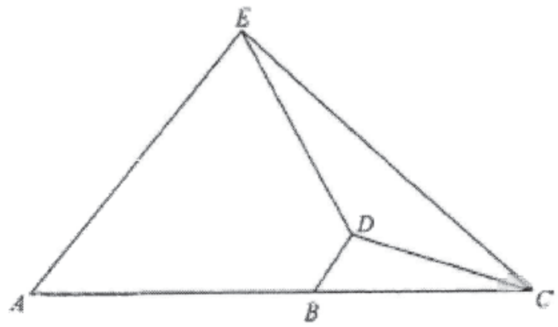
39. In the figure, $ABCD$ is a trapezium with $AD // BC$ and $AD : BC = 2 : 3$. Let E be the mid-point of BC. AC and DE intersect at F. If the area of ΔCEF is $36\ \text{cm}^2$, then the area of the trapezium $ABCD$ is



A. $216\ \text{cm}^2$.
B. $264\ \text{cm}^2$.
C. $280\ \text{cm}^2$.
D. $320\ \text{cm}^2$.

[2013-DSE-MATHS 2-18]

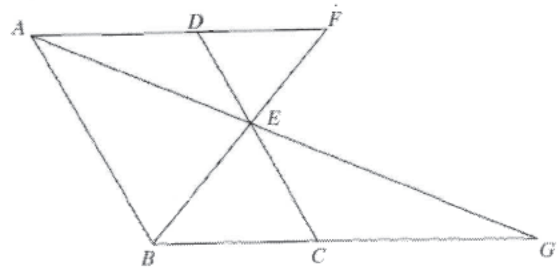
40. In the figure, B is a point lying on AC such that $AB : BC = 3 : 2$. It is given that $AE // BD$. If the area of ΔBCD and the area of ΔCDE are $4\ \text{cm}^2$ and $8\ \text{cm}^2$ respectively, then the area of the trapezium $ABDE$ is



A. $18\ \text{cm}^2$.
B. $21\ \text{cm}^2$.
C. $27\ \text{cm}^2$.
D. $33\ \text{cm}^2$.

[2014-DSE-MATHS 2-17]

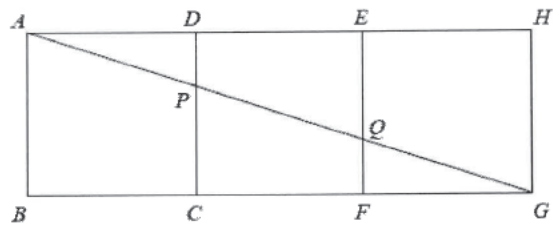
41. In the figure, $ABCD$ is a parallelogram. E is a point lying on CD such that $DE : EC = 2 : 3$. AD produced and BE produced meet at F while AE produced and BC produced meet at G. If the area of ΔDEF is $8\ \text{cm}^2$, then the area of ΔCEG is



A. $12\ \text{cm}^2$.
B. $18\ \text{cm}^2$.
C. $20\ \text{cm}^2$.
D. $27\ \text{cm}^2$.

[2015-DSE-MATHS 2-17]

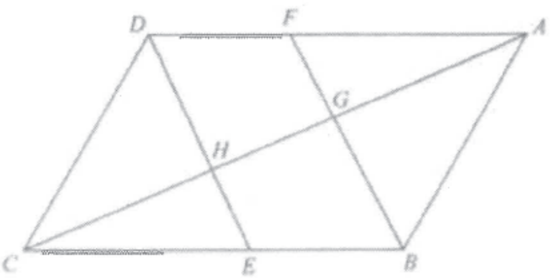
42. In the figure, $ABCD$, $CDEF$ and $EFGH$ are squares. AG cuts CD and EF at P and Q respectively. Find the ratio of the area of the quadrilateral $DEQP$ to the area of the quadrilateral $ABCP$.



A. $1 : 2$
B. $2 : 3$
C. $3 : 5$
D. $4 : 9$

[2016-DSE-MATHS 2-20]

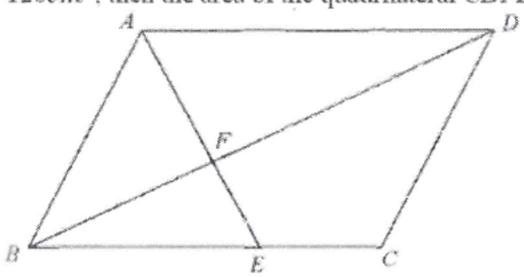
43. In the figure, $ABCD$ and $BEDF$ are parallelograms. E is a point lying on BC such that $BE : EC = 2 : 3$. AC cuts BF and DE at G and H respectively. If the area of ΔABG is $135\ \text{cm}^2$, then the area of the quadrilateral $DFGH$ is



A. $60\ \text{cm}^2$.
B. $81\ \text{cm}^2$.
C. $90\ \text{cm}^2$.
D. $144\ \text{cm}^2$.

[2017-DSE-MATHS 2-16]

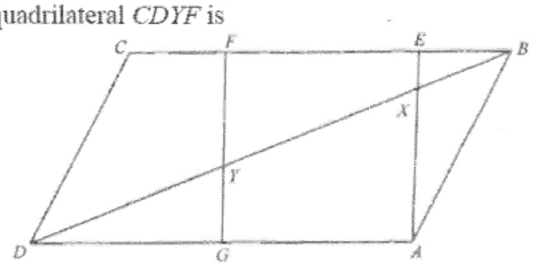
44. In the figure, $ABCD$ is a parallelogram. E is a point lying on BC such that $BE: EC = 5: 3$. AE and BD intersect at point F. If the area of ΔABF is $120 cm^2$, then the area of the quadrilateral $CDFE$ is



A. $237\ cm^2$
B. $307\ cm^2$
C. $312\ cm^2$
D. $429\ cm^2$

[2018-DSE-MATHS 2-16]

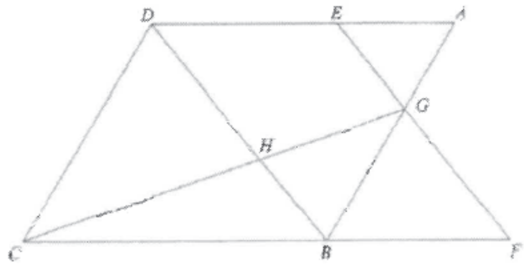
45. In the figure, $ABCD$ is parallelogram and $AEFG$ is a square. It is given that $BE: EF: FC = 2: 7: 3$. BD cuts AE and FG at points X and Y respectively. If the area of ΔABX is $24\ cm^2$, then the area of the quadrilateral $CDYF$ is



A. $54\ cm^2$
B. $77\ cm^2$
C. $81\ cm^2$
D. $87\ cm^2$

[2019-DSE-MATHS 2-16]

46. In the figure, $ABCD$ is a parallelogram. Let E be a point lying on AD such that $AE: ED = 2: 5$. CB is produced to the point F such that $BF = DE$. Denote the point of intersection of AB and EF by G. It is given that BD and CG intersect at the point H. If the area of ΔAEG is $48\ cm^2$, then the area of ΔCDH is



A. $98\ cm^2$
B. $343\ cm^2$
C. $420\ cm^2$
D. $588\ cm^2$

[2020-DSE-MATHS 2-18]

Mensuration of Solids

1. A cube of edge 4 cm floats upright in water with $\frac{3}{4}$ of its volume immersed. The total surface area under water is

   A. 72 cm^2.
   B. 64 cm^2.
   C. 60 cm^2.
   D. 52 cm^2.
   E. 48 cm^2.

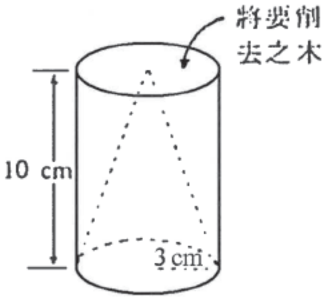
   [1977-CE-MATHS 2-12]

2. If the height, the width and the length of a rectangular block are in the ratios of 1 : 2 : 3 respectively and its total surface area is 88 cm^2, then the height of the block is

   A. 8 cm.
   B. 6 cm.
   C. 4 cm.
   D. 2 cm.
   E. 1 cm.

   [SP-CE-MATHS A2-42]

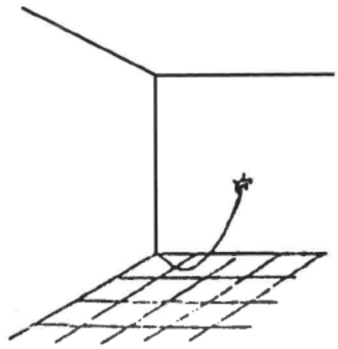
3. A solid wooden cylinder of base radius 3 cm and height 10 cm is to be cut into a right circular cone of the same base radius and height. The volume of wood to be cut away is



   A. 10π cm^3.
   B. 20π cm^3.
   C. 30π cm^3.
   D. 60π cm^3.
   E. 90π cm^3.

   [1978-CE-MATHS 2-23]

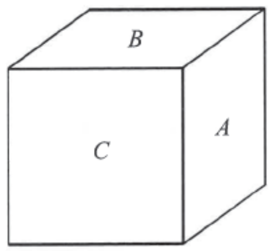
4. A dragonfly is tied to a string 1 metre long attached to a corner of a room. (See figure.) The walls and the floor are at right angles to one another. In how much space, in m^3, can the dragonfly move?



   A. $\frac{3}{32}\pi$
   B. $\frac{1}{6}\pi$
   C. $\frac{1}{3}\pi$
   D. $\frac{2}{3}\pi$
   E. $\frac{4}{3}\pi$

   [1979-CE-MATHS 2-26]

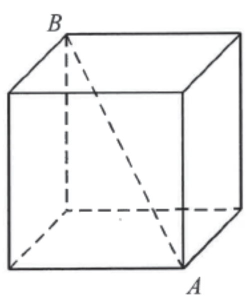
5. In the figure, the areas of the surfaces A, B, C of the cuboid are 10 cm^2, 14 cm^2 and 35 cm^2 respectively. What is the volume of the cuboid?



   A. 49 cm^3
   B. 70 cm^3
   C. 140 cm^3
   D. 350 cm^3
   E. 4900 cm^3

   [1980-CE-MATHS 2-39]

6. The total area of the six faces of the solid cube in the figure is 96 cm^2. What is the length of the diagonal AB?



A. $6\sqrt{2}$ cm

B. $4\sqrt{3}$ cm

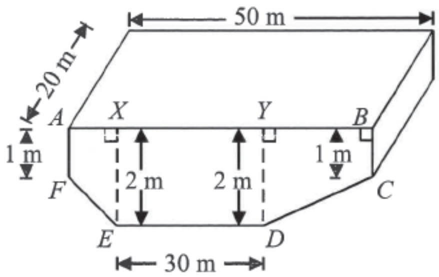
C. $4\sqrt{2}$ cm

D. $2\sqrt{6}$ cm

E. 4 cm

[1981-CE-MATHS 2-16]

7.



The figure above represents a 50 m × 20 m swimming pool. The pool is in the shape of a prism with a rectangular surface and four vertical walls. The dimensions of the sidewall *ABCDEF* are as shown in the figure. What is the capacity of the pool in m^3?

A. 1200

B. 1500

C. 1800

D. 2000

E. It cannot be determined

[1981-CE-MATHS 2-42]

8.

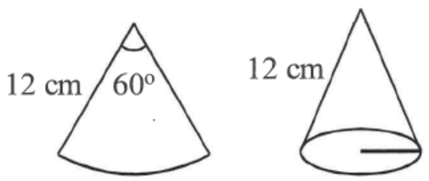


Figure (a) Figure (b)

The cone in Figure (b) is formed by bending the sector in Figure (a). The angle of the sector is 60° and the radius is 12 cm. The radius of the base of the cone is

A. 2 cm .

B. 4 cm .

C. 6 cm .

D. 2π cm .

E. $\frac{360}{\pi}$ cm .

[1981-CE-MATHS 2-47]

9. A right circular cone of altitude $3r$ and base radius r has the same volume as a cube of side x. $x =$

A. πr^3 .

B. πr .

C. $\frac{1}{3}\pi r$.

D. $\sqrt[3]{3\pi}\,r$.

E. $\sqrt[3]{\pi}\,r$.

[1982-CE-MATHS 2-14]

10. A hollow cylindrical metal pipe, 1 m long, has an external radius and an internal radius of 5 cm and 4 cm respectively. The volume of metal is

A. $90\pi\ cm^3$.

B. $100\pi\ cm^3$.

C. $180\pi\ cm^3$.

D. $900\pi\ cm^3$.

E. $1800\pi\ cm^3$.

[1983-CE-MATHS 2-13]

11. A rectangular box, without a lid, is 40 cm long, 30 cm wide and 10 cm height. The area of the external surface of the box is

A. 2 600 cm^2 .

B. 3 400 cm^2 .

C. 3 500 cm^2 .

D. 3 800 cm^2 .

E. 12 000 cm^2 .

[1984-CE-MATHS 2-13]

12. The base radii of two right circular cylinders are in the ratio 2 : 3. If the two cylinders have the same height, what is the ratio of their curved surface area?

A. 2 : 3

B. 4 : 9

C. 8 : 27

D. $\sqrt{8} : \sqrt{27}$

E. None of the above.

[1984-CE-MATHS 2-43]

13. A cone of base radius $2r$ cm and height h cm has a volume of 60 cm^3. The volume of a cylinder of base radius r cm and height $4h$ cm is

A. 60 cm^3 .

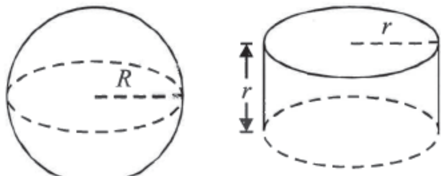
B. 120 cm^3 .

C. 180 cm^3 .

D. 240 cm^3 .

E. 360 cm^3 .

[1985-CE-MATHS 2-43]

14. 

Sphere   Right circular cylineder

In the figure, if $\dfrac{\text{Volume of the sphere}}{\text{Volume of the right circular cylinder}} = \dfrac{9}{2}$, then $\dfrac{R}{r} =$

A. $\dfrac{3}{2}$.

B. $\dfrac{3}{\sqrt{2}}$.

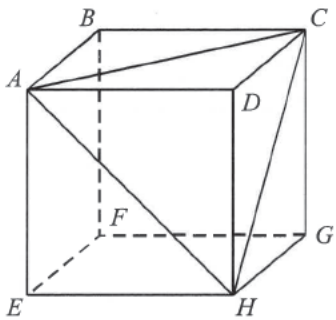
C. 3.

D. $\dfrac{\sqrt[3]{9}}{\sqrt[3]{2}}$.

E. $\dfrac{9}{2}$.

[1986-CE-MATHS 2-12]

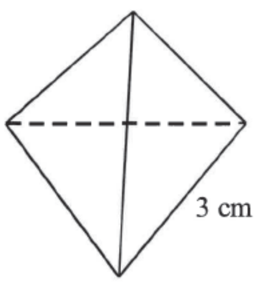
15. *ABCDEFGH* is a cube of side 3 cm. A tetrahedron *DACH* is cut away along the plane *ACH*. The volume of the remaining solid is



A. 6 cm^3.
B. 9 cm^3.
C. 13.5 cm^3.
D. 18 cm^3.
E. 22.5 cm^3.

[1986-CE-MATHS 2-38]

16. The total surface area of a regular tetrahedron of side 3 cm is



A. $\dfrac{9\sqrt{3}}{4}\text{ cm}^2$.

B. 9 cm^2.

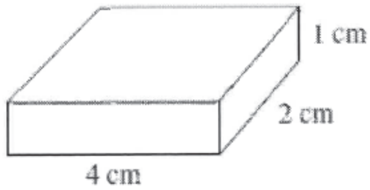
C. $\dfrac{27\sqrt{3}}{4}\text{ cm}^2$.

D. $9\sqrt{3}\text{ cm}^2$.

E. $12\sqrt{3}\text{ cm}^2$.

[1986-CE-MATHS 2-40]

17. A solid rectangular iron block, 4 cm × 2 cm × 1 cm, is melted and recast into a cube. The decrease in the total surface area is



A. 1 cm^2.
B. 2 cm^2.
C. 3 cm^2.
D. 4 cm^2.
E. 5 cm^2.

[1987-CE-MATHS 2-13]

18. Figure A shows a circular measuring cylinder 4 cm in diameter containing water. Three iron balls, each of diameter 2 cm, are dropped into the cylinder as shown in Figure B. What is the rise in the water level?

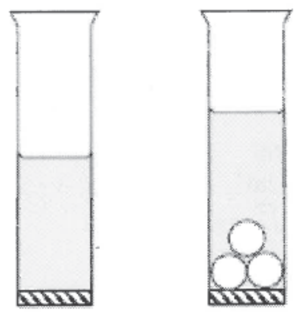


Figure a   Figure b

A. $\dfrac{1}{4}$ cm

B. $\dfrac{1}{3}$ cm

C. $\dfrac{1}{2}$ cm

D. 1 cm

E. 2 cm

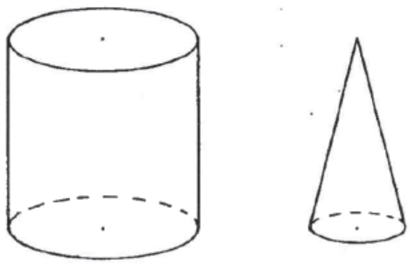
[1987-CE-MATHS 2-14]

19. A solid iron sphere of radius r is melted and recast into a circular cone and a circular cylinder. If both of them have the same height h and the same base radius r, find h in terms of r.

A. $\frac{r}{2}$
B. $\frac{9r}{16}$
C. $\frac{2r}{3}$
D. $\frac{3r}{4}$
E. r

[1988-CE-MATHS 2-10]

20. In the figure, the circular cylinder and the circular cone have the same height. The radius of the base of the cylinder is twice that of the cone. If the volume of the cone is $20\ \text{cm}^3$, what is the volume of the cylinder?



A. $40\ \text{cm}^3$
B. $80\ \text{cm}^3$
C. $120\ \text{cm}^3$
D. $240\ \text{cm}^3$
E. $300\ \text{cm}^3$

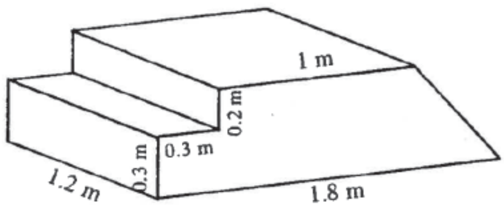
[1990-CE-MATHS 2-11]

21. The length, width and height of a cuboid are in the ratios $3:2:1$. If the total surface area of the cuboid is $88\ \text{cm}^2$, find its volume.

A. $6\ \text{cm}^3$
B. $48\ \text{cm}^3$
C. $48\sqrt{2}\ \text{cm}^3$
D. $96\sqrt{2}\ \text{cm}^3$
E. $384\ \text{cm}^3$

[1990-CE-MATHS 2-12]

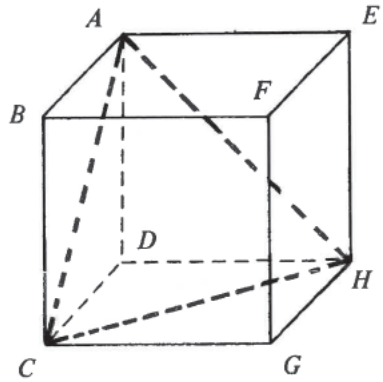
22. The figure shows a solid platform with steps on one side and a slope on the other. Find its volume.



A. $0.75\ \text{m}^3$
B. $0.84\ \text{m}^3$
C. $0.858\ \text{m}^3$
D. $1.008\ \text{m}^3$
E. $1.608\ \text{m}^3$

[1992-CE-MATHS 2-13]

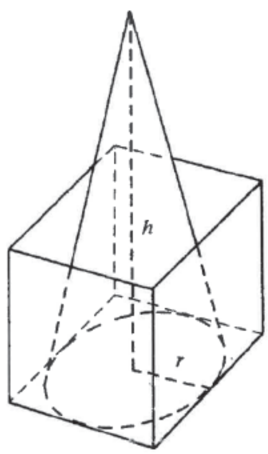
23. Find the ratio of the volume of the tetrahedron $ACHD$ to the volume of the cube $ABCDEFGH$ in the figure.



A. $1:8$
B. $1:6$
C. $1:4$
D. $1:3$
E. $1:2$

[1992-CE-MATHS 2-15]

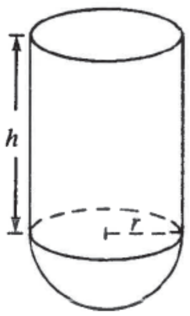
24. In the figure, the base of the conical vessel is inscribed in the bottom of the cubical box. If the box and the conical vessel have the same capacity, find $h:r$.



A. $24:\pi$
B. $3:1$
C. $6:\pi$
D. $3:\pi$
E. $8:3\pi$

[1993-CE-MATHS 2-16]

25.



The figure shows a solid consisting of a cylinder of height h and a hemisphere of radius r. The area of the curved surface of the cylinder is twice that of the hemisphere.

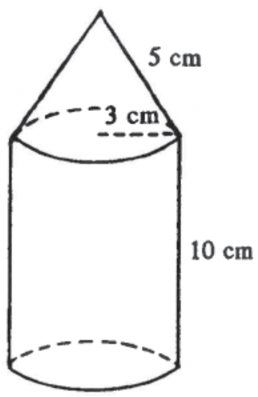
Find the ratio

volume of cylinder : volume of hemisphere.

A. 1 : 3
B. 2 : 3
C. 3 : 4
D. 3 : 2
E. 3 : 1

[1993-CE-MATHS 2-17]

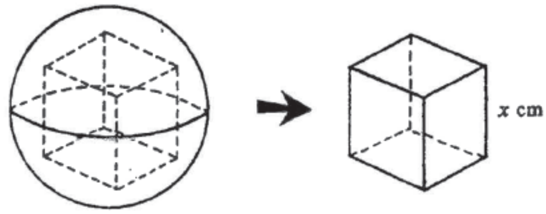
26. In the figure, the solid consists of a cylinder and a right circular cone with a common base which is a circle of radius 3 cm. The height of the cylinder is 10 cm and the slant height of the cone is 5 cm. Find the total surface area of the solid.



A. 75π cm^3
B. 84π cm^3
C. 93π cm^3
D. 105π cm^3
E. 114π cm^3

[1995-CE-MATHS 2-15]

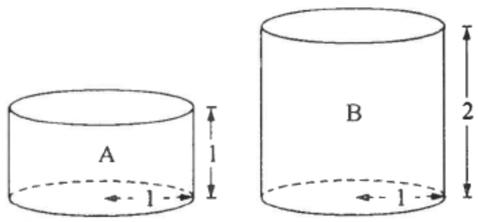
27. In the figure, a solid wooden sphere of radius 3 cm is to be cut into a cube of side x cm. Find the largest possible value of x.



A. $3\sqrt{2}$
B. $2\sqrt{3}$
C. 3
D. $\frac{3}{2}\sqrt{2}$
E. $\sqrt{3}$

[1995-CE-MATHS 2-48]

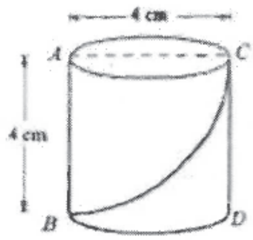
28. In the figure, A and B are two right solid cylinders with the same base radius 1. If the heights of A and B are 1 and 2 respectively, find $\dfrac{\text{the total surface area of } A}{\text{the total surface area of } B}$.



A. $\frac{1}{8}$
B. $\frac{1}{4}$
C. $\frac{1}{2}$
D. $\frac{3}{5}$
E. $\frac{2}{3}$

[1996-CE-MATHS 2-18]

29. The figure shows a right circular cylinder with AC being a diameter of its upper face. AB and CD are two vertical lines on the curved surface. A curve is drawn on the surface of the cylinder from B to C. Find its shortest possible length.



A. 2π cm

B. $2\sqrt{\pi^2+4}$ cm

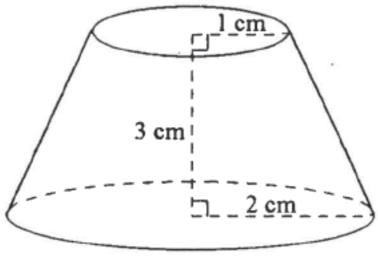
C. $4\sqrt{2}$ cm

D. $4\sqrt{\pi^2+1}$ cm

E. $4\sqrt{\pi^2+4}$ cm

[1996-CE-MATHS 2-27]

30. The figure shows a frustum of a right circular cone. The radii of the upper face and the base are 1 cm and 2 cm respectively. If the height is 3 cm, find the volume.



A. 3π cm^3

B. $\frac{9}{2}\pi$ cm^3

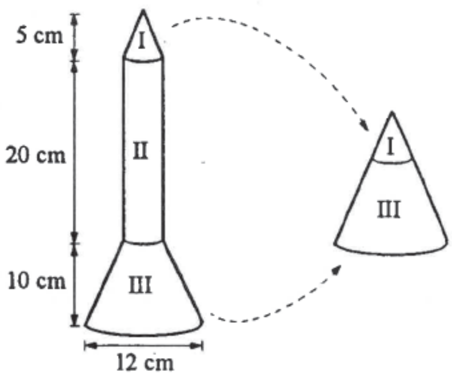
C. $\frac{11}{2}\pi$ cm^3

D. 7π cm^3

E. $\frac{15}{2}\pi$ cm^3

[1996-CE-MATHS 2-45]

31. In the figure, the rocket model consists of three parts. Parts I and III can be joined together to form a right circular cone. Part II is a right cylinder. Find the volume of the rocket model.



A. 260π cm^3

B. 360π cm^3

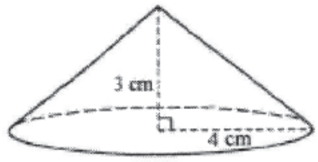
C. 620π cm^3

D. 720π cm^3

E. 900π cm^3

[1997-CE-MATHS 2-49]

32. The figure shows a right circular cone of base radius 4 cm and height 3 cm. Find the area of its curved surface.



A. 12π cm^2

B. 16π cm^2

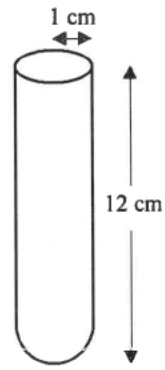
C. 20π cm^2

D. 24π cm^2

E. 48π cm^2

[1998-CE-MATHS 2-20]

33. The figure shows a test tube consisting of a cylindrical upper part of radius 1 cm and a hemispherical lower part of the same radius. If the height of the test tube is 12 cm, find its capacity.



A. $\frac{35}{3}\pi$ cm^3

B. $\frac{37}{3}\pi$ cm^3

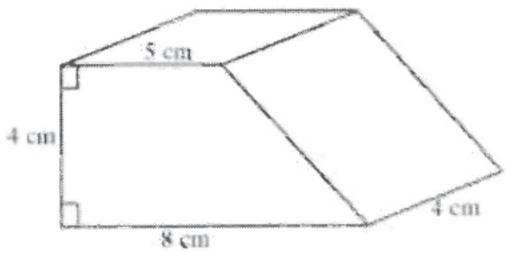
C. $\frac{38}{3}\pi$ cm^3

D. $\frac{40}{3}\pi$ cm^3

E. $\frac{68}{3}\pi$ cm^3

[1998-CE-MATHS 2-22]

34. The figure shows a right prism. Find its total surface area.



A. 104 cm^2

B. 108 cm^2

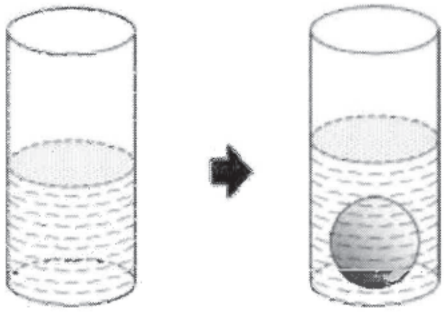
C. 114 cm^2

D. 120 cm^2

E. 140 cm^2

[1999-CE-MATHS 2-22]

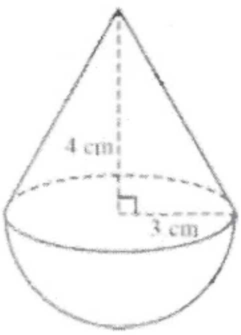
35. In the figure, a cylindrical vessel of internal diameter 6 cm contains some water. A steel ball of radius 2 cm is completely submerged in the water. Find the rise in the water level.



A. $\frac{32}{27}$ cm
B. $\frac{8}{27}$ cm
C. $\frac{16}{9}$ cm
D. $\frac{4}{9}$ cm
E. $\frac{8}{3}$ cm

[1999-CE-MATHS 2-23]

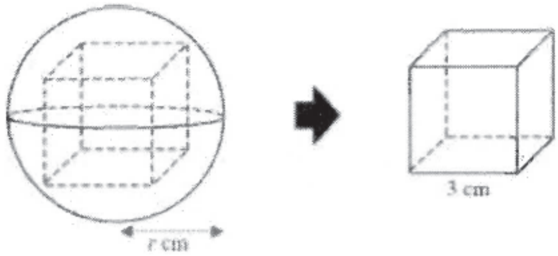
36. In the figure, the solid consists of a right circular cone and a hemisphere with a common base. Find the volume of the solid.



A. 30π cm^3
B. 33π cm^3
C. 48π cm^3
D. 54π cm^3
E. 72π cm^3

[1999-CE-MATHS 2-24]

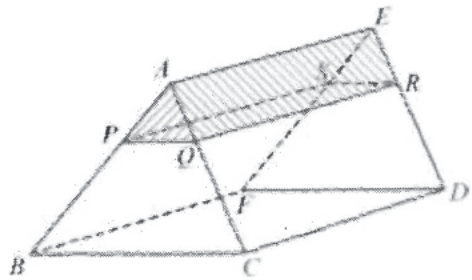
37. In the figure, a solid wooden sphere of radius r cm is to be cut into a cube of side 3 cm. Find the smallest possible value of r.



A. $\frac{3\sqrt{3}}{2}$
B. $\frac{3\sqrt{2}}{2}$
C. $\frac{3}{2}$
D. $3\sqrt{3}$
E. $3\sqrt{2}$

[2000-CE-MATHS 2-33]

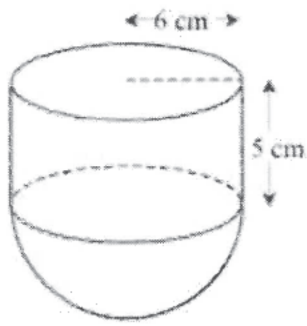
38. In the figure, $ABCDEF$ is a right triangular prism. It is cut into two parts along the plane $PQRS$, which is parallel to the face $BCDF$, and $AP : PB = 2 : 5$. Find $\frac{\text{volume of the prism } APQRES}{\text{volume of the prism } ABCDEF}$.



A. $\frac{2}{7}$
B. $\frac{4}{25}$
C. $\frac{4}{49}$
D. $\frac{8}{125}$
E. $\frac{8}{343}$

[2000-CE-MATHS 2-43]

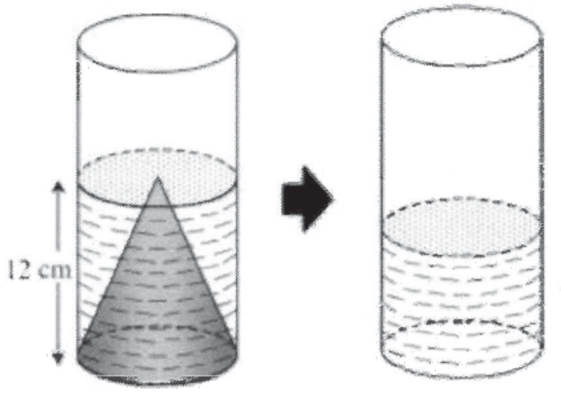
39. In the figure, the solid consists of a cylinder and a hemisphere with a common base of radius 6 cm. Find the total surface area of the solid.



A. 132π cm^2
B. 168π cm^2
C. 204π cm^2
D. 240π cm^2
E. 324π cm^2

[2001-CE-MATHS 2-8]

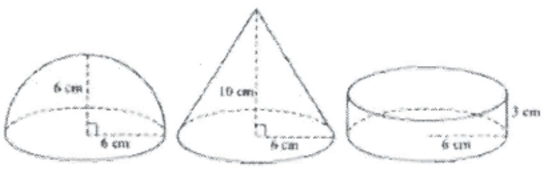
40. In the figure, a solid right circular cone of height 12 cm is put into a cylinder which has the same internal radius as the base radius of the cone. Water is then poured into the cylinder until the water level just reaches the tip of the cone. If the cone is removed, what is the height of the water in the cylinder?



A. 3 cm
B. 4 cm
C. 6 cm
D. 8 cm
E. 9 cm

[2001-CE-MATHS 2-24]

41. The figure shows a hemisphere, a right circular cone and a right cylinder with equal base radii. Their volumes are $a\text{ cm}^3$, $b\text{ cm}^3$ and $c\text{ cm}^3$ respectively.

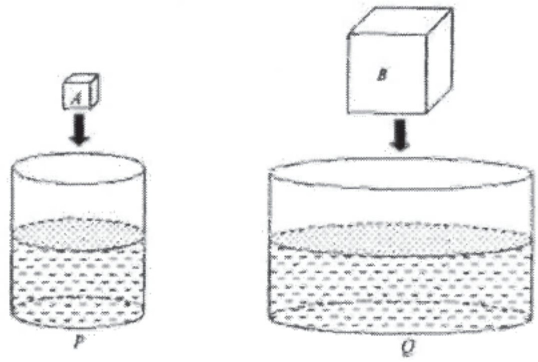


Which of the following is true?

A. $a < b < c$
B. $a < c < b$
C. $c < a < b$
D. $c < b < a$

[2002-CE-MATHS 2-19]

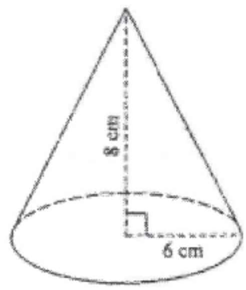
42. In the figure, P and Q are two right cylindrical vessels each containing some water. The two vessels are placed on the same horizontal surface. The internal base radii of P and Q are in the ratio $1:3$. A and B are two cubes with sides in the ratio $1:2$. A and B are put into P and Q respectively. Suppose both cubes are totally immersed in water without any overflow. If the rise in water level in P is 1 cm, then the rise in water level in Q is



A. $\frac{2}{3}$ cm .
B. $\frac{9}{8}$ cm .
C. $\frac{8}{9}$ cm .
D. $\frac{8}{27}$ cm .

[2002-CE-MATHS 2-45]

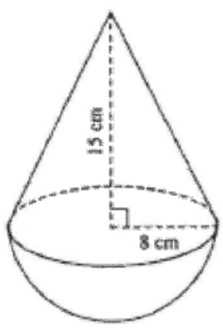
43. The figure shows a right circular cone of base radius 6 cm and height 8 cm . Find its volume.



A. $32\pi\text{ cm}^3$
B. $60\pi\text{ cm}^3$
C. $96\pi\text{ cm}^3$
D. $288\pi\text{ cm}^3$

[2003-CE-MATHS 2-20]

44. In the figure, the solid consists of a right circular cone and a hemisphere with a common base. Find the total surface area of the solid.



A. $136\pi\ \text{cm}^2$
B. $248\pi\ \text{cm}^2$
C. $264\pi\ \text{cm}^2$
D. $392\pi\ \text{cm}^2$

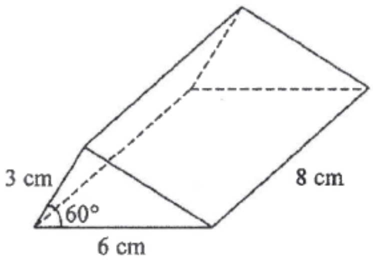
[2003-CE-MATHS 2-21]

45. The figure shows a solid right circular cone of height 5 cm and slant height 13 cm. Find the total surface area of the cone.

A. $144\pi\ \text{cm}^2$
B. $156\pi\ \text{cm}^2$
C. $240\pi\ \text{cm}^2$
D. $300\pi\ \text{cm}^2$

[2005-CE-MATHS 2-17]

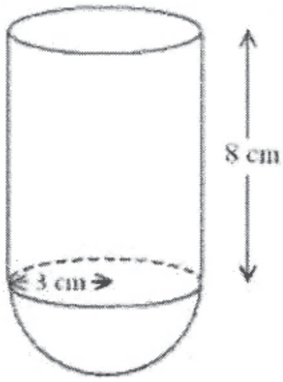
46. The figure shows a right triangular prism. Find the volume of the prism.



A. $36\ \text{cm}^3$
B. $72\ \text{cm}^3$
C. $36\sqrt{3}\ \text{cm}^3$
D. $72\sqrt{3}\ \text{cm}^3$

[2005-CE-MATHS 2-18]

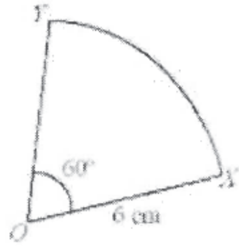
47. In the figure, the solid consists of a hemisphere of radius 3 cm joined to the bottom of a right circular cylinder of height 8 cm and base radius 3 cm. Find the volume of the solid.

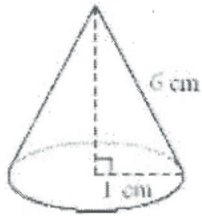


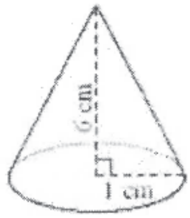
A. $75\pi\ \text{cm}^3$
B. $90\pi\ \text{cm}^3$
C. $93\pi\ \text{cm}^3$
D. $108\pi\ \text{cm}^3$

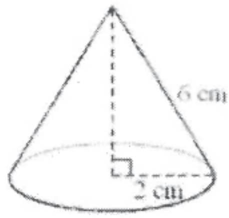
[2006-CE-MATHS 2-18]

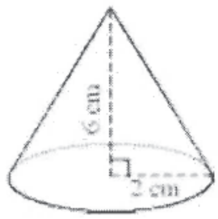
48. In the figure, sector OXY is a thin metal sheet. By joining OX and OY together, which of the following right circular cones can be folded?



A.


B.


C.


D.


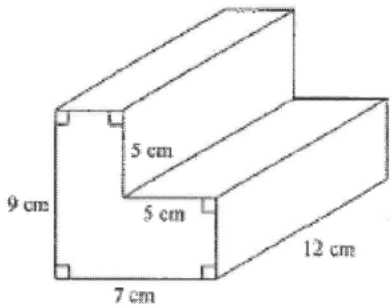
[2006-CE-MATHS 2-20]

49. If the length of a side of a regular tetrahedron is 3 cm, then the height of the tetrahedron is

A. 3 cm.
B. $\sqrt{3}$ cm.
C. $\sqrt{6}$ cm.
D. $\frac{3\sqrt{3}}{2}$ cm.

[2006-CE-MATHS 2-45]

50. In the figure, the volume of the right prism is



A. 456 cm^3 .
B. 540 cm^3 .
C. 552 cm^3 .
D. 636 cm^3 .

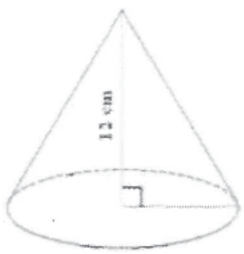
[2007-CE-MATHS 2-17]

51. If a solid metal hemisphere of radius r is melted and recast into 3 identical solid right circular cones of height h and base radius r, then $r : h =$

A. $2 : 3$.
B. $3 : 2$.
C. $3 : 4$.
D. $4 : 3$.

[2007-CE-MATHS 2-18]

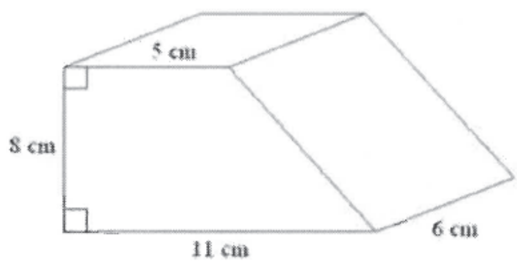
52. The figure shows a solid right circular cone of height 12 cm. The circumference of the base is 18π cm. Find the total surface area of the circular cone.



A. 81π cm^2
B. 135π cm^2
C. 216π cm^2
D. 324π cm^2

[2008-CE-MATHS 2-18]

53. In the figure, the volume of the right prism is



A. 128 cm^3 .
B. 332 cm^3 .
C. 384 cm^3 .
D. 768 cm^3 .

[2008-CE-MATHS 2-19]

54. The base of a solid right pyramid is a square. If the perimeter of the base is 48 cm and the length of each slant edge of the pyramid is 10 cm, then the total surface area of the pyramid is

A. 192 cm^2 .
B. 336 cm^2 .
C. 384 cm^2 .
D. $96\sqrt{7}$ cm^2 .

[2009-CE-MATHS 2-17]

55. The base radius and the height of a right circular cylinder are 3 cm and 12 cm respectively while the base radius of a right circular cone is 6 cm. If the volume of the circular cylinder and the volume of the circular cone are the same, then the height of the circular cone is

A. 3 cm .
B. 9 cm .
C. 18 cm .
D. 27 cm .

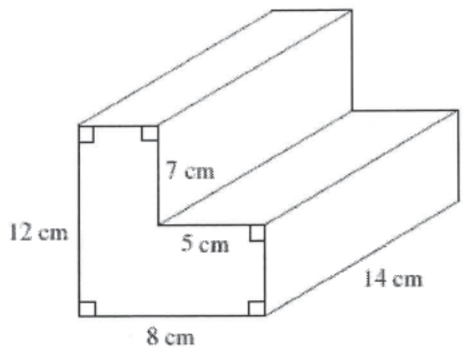
[2009-CE-MATHS 2-18]

56. The volume of a right circular cylinder of radius R is twice the volume of another right circular cylinder of radius r. If the heights of these two circular cylinders are the same, then $R : r =$

A. $2 : 1$.
B. $4 : 1$.
C. $\sqrt{2} : 1$.
D. $\sqrt{3} : 1$.

[2010-CE-MATHS 2-18]

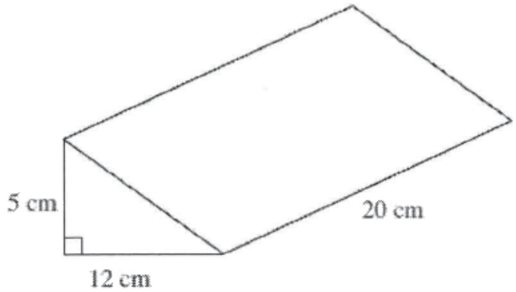
57. In the figure, the total surface area of the solid right prism is



A. 560 cm^2.
B. 621 cm^2.
C. 682 cm^2.
D. 854 cm^2.

[2010-CE-MATHS 2-19]

58. In the figure, the total surface area of the solid right triangular prism is



A. 120 cm^2.
B. 600 cm^2.
C. 660 cm^2.
D. 720 cm^2.

[2011-CE-MATHS 2-17]

59. If the volume of a solid hemisphere of radius r is equal to the volume of a solid right circular cylinder of height h and base radius r, then $r : h =$

A. $2:3$.
B. $3:2$.
C. $3:4$.
D. $4:3$.

[2011-CE-MATHS 2-18]

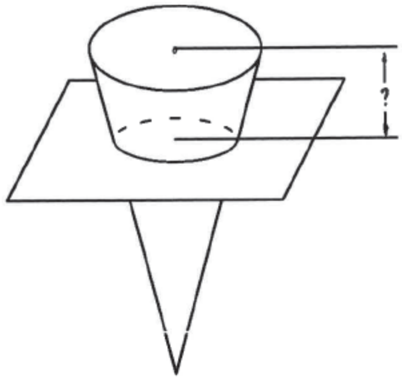
Mensuration of Similar Solids

60. V_1 = the volume of a sphere of radius $2a$.
V_2 = the volume of a sphere of radius $3a$.
Then $V_1 : V_2 =$

A. $2:3$.
B. $4:9$.
C. $8:27$.
D. $4\pi : 9\pi$.
E. $\sqrt[3]{2} : \sqrt[3]{3}$.

[SP-CE-MATHS 2-34]

61. A circular hole of diameter 8 cm is drilled in a thin plate for holding a right circular cone. (See figure.) The base of the cone is parallel to the plate. If the base diameter of the cone is 10 cm and the height of the cone is 20 cm, what is the distance between the base of the cone and the plate?



A. 2 cm
B. 4 cm
C. 6 cm
D. 8 cm
E. 10 cm

[1979-CE-MATHS 2-45]

62. A, B, C are three spheres.

If $\dfrac{\text{Surface area of } A}{\text{Surface area of } B} = 4$ and

$\dfrac{\text{Volume of } B}{\text{Volume of } C} = 2$,

then $\dfrac{\text{Volume of } A}{\text{Volume of } C} =$

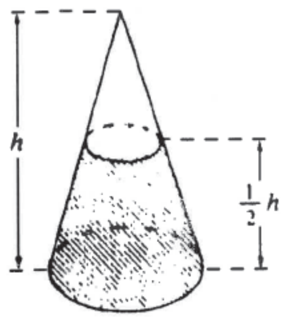
A. 16.
B. 8.
C. 2.
D. $\frac{1}{8}$.
E. $\frac{1}{16}$.

[1980-CE-MATHS 2-30]

63. The height of the cone in the figure is h. It contains water to a depth of $\frac{1}{2}h$.

$\dfrac{\text{Volume of water}}{\text{Capacity of the cone}} =$

A. $\frac{1}{8}$.
B. $\frac{1}{4}$.
C. $\frac{1}{2}$.
D. $\frac{3}{4}$.
E. $\frac{7}{8}$.



[1981-CE-MATHS 2-41]

64. The external and internal radii of a hollow metal sphere are 4 cm and 3 cm respectively. $\dfrac{\text{Volume of metal}}{\text{Volume of the enclosed empty space}} =$

A. $\frac{1}{27}$.

B. $\frac{1}{3}$.

C. $\frac{4}{3}$.

D. $\frac{37}{27}$.

E. $\frac{64}{27}$.

[1984-CE-MATHS 2-41]

65. A solid metal sphere of volume 252 cm^3 is melted and recast into 3 smaller solid spheres whose radii are in the ratio $1:2:3$. The volume of the smaller sphere is

A. 5 cm^3.

B. 7 cm^3.

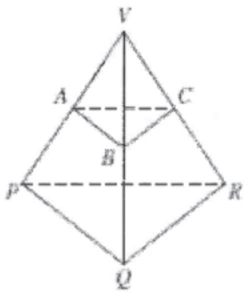
C. 14 cm^3.

D. 18 cm^3.

E. 28 cm^3.

[1984-CE-MATHS 2-42]

66. In the figure, the volumes of the pyramids $VABC$ and $VPQR$ are 27 cm^3 and 64 cm^3 respectively. Planes ABC and PQR are parallel. Area of ΔABC : Area of ΔPQR =



A. $\sqrt{27}:\sqrt{64}$.

B. $\sqrt{37}:\sqrt{64}$.

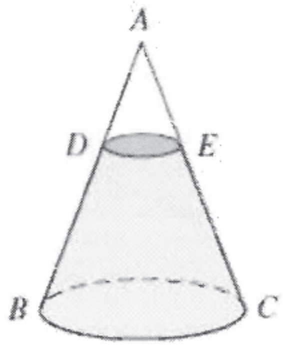
C. $3:4$.

D. $9:16$.

E. $27:64$.

[1985-CE-MATHS 2-44]

67. A right conical vessel placed on horizontal ground contains some water as shown in the figure. If $AD : DB = 2:3$, then $\dfrac{\text{volume of empty space}}{\text{volume of water}} =$



A. $\frac{4}{9}$.

B. $\frac{8}{19}$.

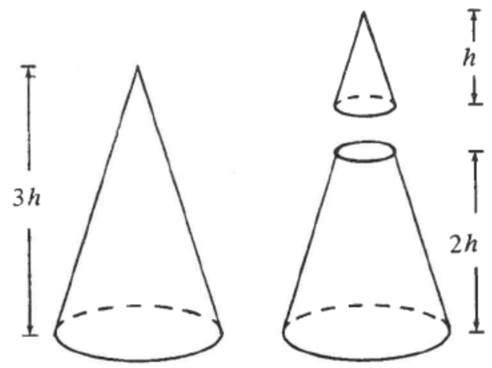
C. $\frac{8}{27}$.

D. $\frac{8}{117}$.

E. $\frac{8}{125}$.

[1989-CE-MATHS 2-12]

68.



In the figure, a cone of height $3h$ is cut by a plane parallel to its base into a smaller cone of height h and a frustum. Find the ratio of the volume of the smaller cone to the volume of the frustum.

A. $1:27$

B. $1:26$

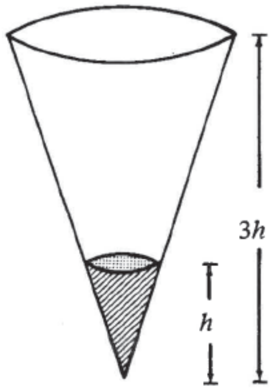
C. $1:9$

D. $1:8$

E. $1:7$

[1992-CE-MATHS 2-17]

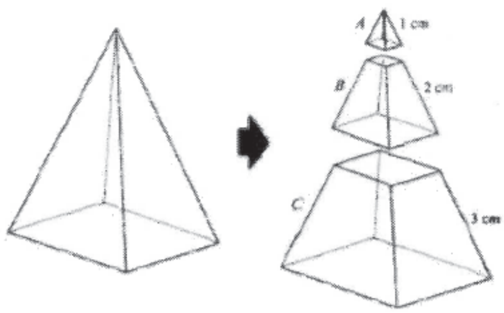
69. In the figure, the paper cup in the form of a circular cone contains 10 ml of water. How many ml of water must be added to fill up the paper cup?



A. 20
B. 80
C. 90
D. 260
E. 270

[1994-CE-MATHS 2-13]

70. In the figure, a right pyramid with a square base is divided into three parts A, B and C by two planes parallel to the base such that the lengths of their slant edges are 1 cm, 2 cm and 3 cm respectively.

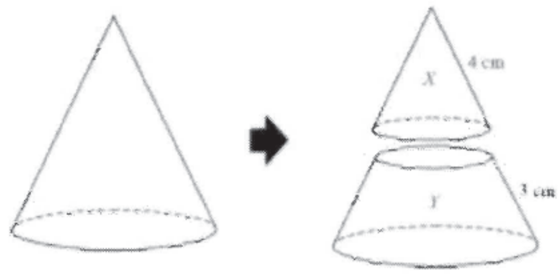


Find volume of A : volume of B : volume of C.

A. 1 : 2 : 3
B. 1 : 4 : 9
C. 1 : 8 : 27
D. 1 : 26 : 189
E. 1 : 27 : 216

[1998-CE-MATHS 2-42]

71. In the figure, a right circular cone is divided into two parts X and Y by a plane parallel to the base such that the lengths of their slant edges are 4 cm and 3 cm respectively. Find the ratio of the curved surface areas of X and Y.



A. 16 : 9
B. 16 : 33
C. 16 : 49
D. 64 : 27
E. 64 : 279

[1999-CE-MATHS 2-37]

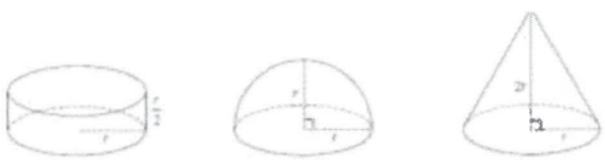
72. It is given that A, B and C are solid spheres. If the volume of B : the volume of C = 1 : 8 and the surface area of A : the surface area of B = 9 : 4, then the radius of A : the radius of C =

A. 3 : 4 .
B. 3 : 16 .
C. 9 : 8 .
D. 9 : 32 .

[2009-CE-MATHS 2-19]

HKDSE Problems

73. The figure shows a right circular cylinder, a hemisphere and a right circular cone with equal base radii. Their curved surface areas are a cm^2, b cm^2 and c cm^2 respectively.

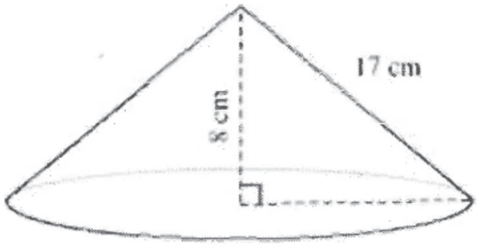


Which of the following is true?

A. $a < b < c$
B. $a < c < b$
C. $c < a < b$
D. $c < b < a$

[SP-DSE-MATHS 2-17]

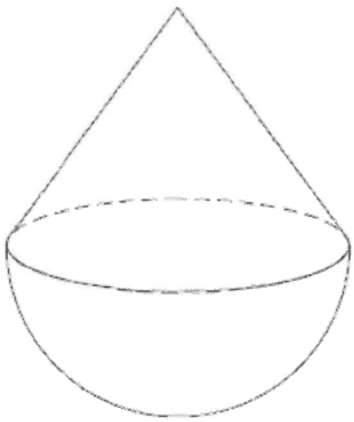
74. The figure shows a right circular cone of height 8 cm and slant height 17 cm. Find the volume of the circular cone.



A. 255π cm^3
B. 345π cm^3
C. 480π cm^3
D. 600π cm^3

[PP-DSE-MATHS 2-16]

75. In the figure, the solid consists of a right circular cone and a hemisphere with a common base. The base radius and the height of the circular cone are 3 cm and 4 cm respectively. Find the total surface area of the solid.



A. 30π cm^2
B. 33π cm^2
C. 48π cm^2
D. 51π cm^2

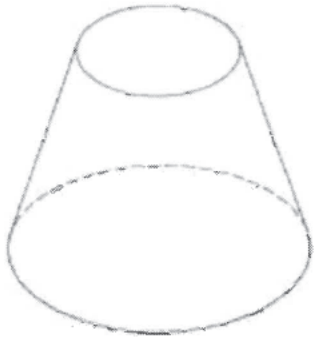
[2013-DSE-MATHS 2-17]

76. If the height of a regular tetrahedron is 2 cm, then the volume of the tetrahedron is

A. 2 cm^3.
B. $\sqrt{3}$ cm^3.
C. $\sqrt{6}$ cm^3.
D. $3\sqrt{3}$ cm^3.

[2013-DSE-MATHS 2-40]

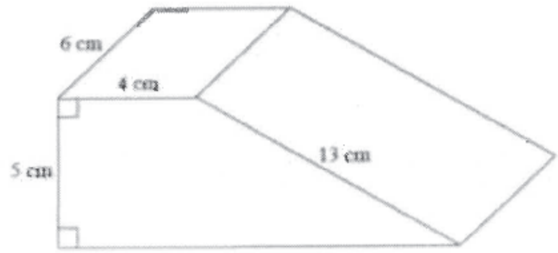
77. The height and the base radius of a right circular cone are 12 cm and 9 cm respectively. The figure shows a frustum which is made by cutting off the upper part of the circular cone. The height of the frustum is 8 cm. Find the volume of the frustum.



A. 210π cm^3
B. 312π cm^3
C. 324π cm^3
D. 936π cm^3

[2015-DSE-MATHS 2-16]

78. The figure shows a right prism. Find the volume of the prism.



A. 216 cm^3.
B. 240 cm^3.
C. 300 cm^3.
D. 328 cm^3.

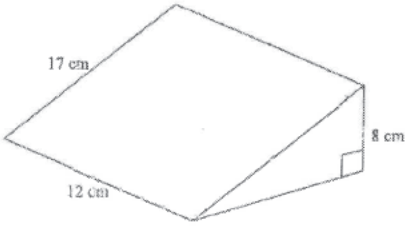
[2016-DSE-MATHS 2-18]

79. The base radius of a right circular cone is 2 times the base radius of a right circular cylinder while the height of the circular cylinder is 3 times the height of the circular cone. If the volume of the circular cone is 36π cm^3, then the volume of the circular cylinder is

A. 27π cm^3.
B. 48π cm^3.
C. 81π cm^3.
D. 144π cm^3.

[2017-DSE-MATHS 2-15]

80. In the figure, the volume of the solid right triangular prism is



A. 544 cm^3
B. 600 cm^3
C. 660 cm^3
D. 720 cm^3

[2018-DSE-MATHS 2-15]

81. The base of a solid right pyramid is a square of side 18 cm. If the height of the pyramid is 12 cm, then the total surface area of the pyramid is

A. 432 cm^2
B. 540 cm^2
C. 756 cm^2
D. 864 cm^2

[2019-DSE-MATHS 2-15]

82. If the volume of a right circular cylinder of base radius $5a$ cm and height $7b$ cm is 525 cm^3, then the volume of a right circular cone of base radius $7a$ cm and height $5b$ cm is

A. 175 cm^3
B. 245 cm^3
C. 490 cm^3
D. 735 cm^3

[2020-DSE-MATHS 2-16]

Percentage Change in Mensuration

1. If the height and the base diameter of a cone are doubled, the new volume of the cone will be

   A. 2 times the original volume.
   B. 2π times the original volume.
   C. 4 times the original volume.
   D. 4π times the original volume.
   E. 8 times the original volume.

   [SP-CE-MATHS 2-35]

2. If the length of a rectangle is increased by 10% and the width decreased by 10%, which of the following is true?

   A. Its area remains the same.
   B. Its area is decreased by 1%.
   C. Its area is increased by 1%.
   D. Its area is decreased by 10%.
   E. Its area is increased by 10%.

   [1980-CE-MATHS 2-13]

3. If the surface area of a spherical soap bubble increases by 44%, its volume increases by

   A. 20% .
   B. 33.1% .
   C. 60% .
   D. 66% .
   E. 72.8% .

   [1981-CE-MATHS 2-15]

4. Some air escapes from a spherical balloon of volume a^3. The balloon keeps its spherical shape and is now of volume b^3. What is the percentage decrease in the radius?

   A. $\frac{a-b}{a} \times 100\%$
   B. $\frac{a-b}{b} \times 100\%$
   C. $\sqrt[3]{\frac{a^3-b^3}{a^3}} \times 100\%$
   D. $\sqrt[3]{\frac{a^3-b^3}{b^3}} \times 100\%$
   E. $\frac{a^3-b^3}{a^3} \times 100\%$

   [1982-CE-MATHS 2-15]

5. A solid sphere is cut into two hemispheres. The percentage increase in the total surface area is

   A. 25% .
   B. $33\frac{1}{3}\%$.
   C. 50% .
   D. 75% .
   E. 100% .

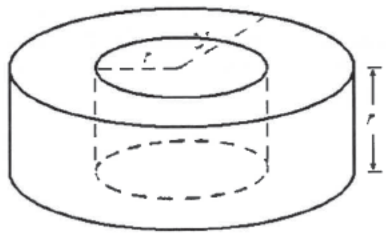
   [1983-CE-MATHS 2-45]

6. The length and the width of a cuboid are each increased by 10% and the height remains unchanged. The percentage increased in volume is

   A. 10% .
   B. 20% .
   C. 21% .
   D. 24% .
   E. 33% .

   [1985-CE-MATHS 2-42]

7. A cylindrical hole of radius r is drilled through a solid cylinder, base radius $2r$ and height r, as shown in the figure. The percentage increase in the total surface area is



   A. 0% .
   B. $16\frac{2}{3}\%$.
   C. 20% .
   D. 25% .
   E. $33\frac{1}{3}\%$.

   [1988-CE-MATHS 2-45]

8. A blanket loses 10% of its length and 8% of its width after washing. The percentage loss in area is

   A. 18.8% .
   B. 18% .
   C. 17.2% .
   D. 9% .
   E. 8% .

   [1991-CE-MATHS 2-11]

9. The length of a rectangle is decreased by 20%. If the area remains unchanged, find the percentage increase of its width.

   A. $1\frac{1}{4}\%$
   B. $12\frac{1}{2}\%$
   C. $16\frac{2}{3}\%$
   D. 20%
   E. 25%

[1996-CE-MATHS 2-43]

10. The length of a rectangle is decreased by 20% but its breadth is increased by $k\%$. If the area of the rectangle remains unchanged, find the value of k.

   A. 20
   B. 25
   C. 75
   D. 80

[2011-CE-MATHS 2-11]

HKDSE Problems

11. If the length and the width of a rectangle are increased by 20% and $x\%$ respectively so that its area is increased by 50%, then $x =$

   A. 20 .
   B. 25 .
   C. 30 .
   D. 35 .

[SP-DSE-MATHS 2-12]

12. If the circumference of a circle is increased by 40%, then the area of the circle is increased by

   A. 18% .
   B. 20% .
   C. 40% .
   D. 96% .

[PP-DSE-MATHS 2-11]

13. If the angle and the radius of a sector are decreased by $x\%$ and 50% respectively so that its area is decreased by 90%, then $x =$

   A. 20 .
   B. 40 .
   C. 60 .
   D. 80 .

[2014-DSE-MATHS 2-10]