1993 HKCEE MATHS Paper II

1 If $f(x)=10^{2x}$, then $f(4y)=$

A. 10^{4y}

B. 10^{2+4y}

C. 10^{8y}

D. 40^{y}

E. 40^{2y}

2 If $s=\frac{n}{2}[2a+(n-1)d]$, then $d=$

A. $\frac{2(s-an)}{n(n-1)}$

B. $\frac{2(s-an)}{n-1}$

C. $\frac{s}{n(n-1)}$

D. $\frac{as-n}{a(n-1)}$

E. $\frac{4(s-an)}{n(n-1)}$

3 Simplify $\left(x^2-\sqrt{3}x+1\right)\left(x^2+\sqrt{3}x+1\right)$

A. x^4+1

B. x^4-x^2+1

C. x^4+x^2+1

D. $x^4-3x^2-2\sqrt{3}x-1$

E. $x^4+\sqrt{3}x^3-2\sqrt{3}x^2+\sqrt{3}x+1$

4 Simplify $\frac{\sqrt{b}}{\sqrt{a}-\sqrt{b}}+\frac{\sqrt{a}}{\sqrt{a}+\sqrt{b}}$.

A. $\frac{1}{\sqrt{a}-\sqrt{b}}$

B. $\frac{a+2\sqrt{ab}-b}{a-b}$

C. $\frac{\sqrt{b}+\sqrt{a}}{2\sqrt{a}}$

D. $\frac{b+2\sqrt{ab}-a}{a-b}$

E. $\frac{a+b}{a-b}$

5 If $3x^2+ax-5\equiv(bx-1)(2-x)-3$, then

A. $a=-5, b=-3$

B. $a=-5, b=3$

C. $a=-3, b=-5$

D. $a=5, b=-3$

E. $a=3, b=5$

6 Find the greatest value of $3x+2y$ if (x, y) is a point lying in the region $OABCD$ (including the boundary).

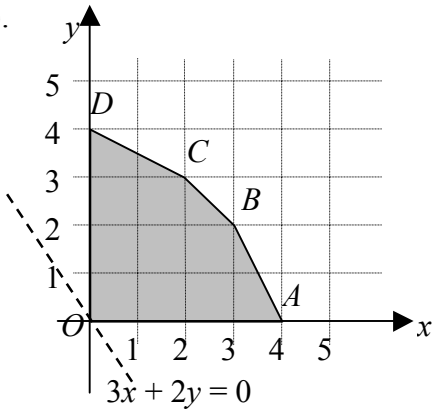
A. 15

B. 13

C. 12

D. 9

E. 8



7 The diagram shows the graphs of $y=ax^2+bx$ and $y=cx+d$. The solutions of the equation $ax^2+bx=cx+d$ are

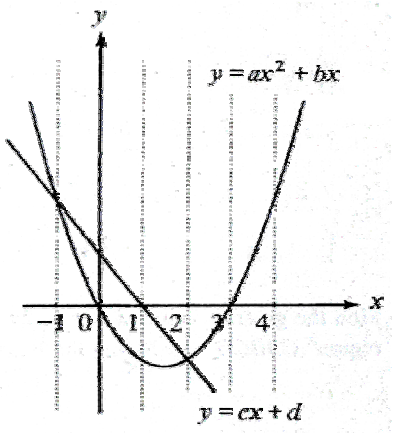
A. –1, 1

B. –1, 2

C. 0, 1

D. 0, 3

E. 1, 3



8 If $\log(p+q)=\log p+\log q$, then

A. $p=q=1$

B. $p=\frac{q}{q-1}$

C. $p=\frac{q}{q+1}$

D. $p=\frac{q+1}{q}$

E. $p=\frac{q-1}{q}$

9 The expression x^2-2x+k is divisible by $(x+1)$. Find the remainder when it is divided by $(x+3)$.

A. 1

B. 4

C. 12

D. 16

E. 18

10 If 3, a, b, c, 23 are in A.S., then $a + b + c =$

A. 13

B. 26 D. 39

C. 33 E. 65

11 Find the H.C.F. and L.C.M. of ab^2c and abc^3

	H.C.F.	L.C.M.
A.	a	$a^2b^3c^4$
B.	abc	ab^2c^3
C.	abc	$a^2b^3c^4$
D.	ab^2c^3	abc
E.	$a^2b^3c^4$	abc

12 If α and β are the roots of the quadratic equation $x^2 - 3x - 1 = 0$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

A. –3

B. –1 D. $\frac{2}{3}$

C. $-\frac{1}{3}$ E. 3

13 If the simultaneous equations $\begin{cases} y = x^2 - k \\ y = x \end{cases}$ have only one solution, find k.

A. –1

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

C. -4 E. 1

14 The price of a cylindrical cake of radius r and height h varies directly as the volume. If r =5cm and h = 4cm, the price is \$30. Find the price when r = 4cm and h =6cm.

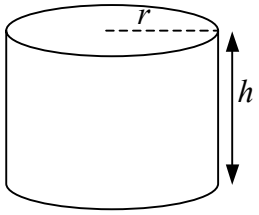
A. \$25

B. \$28.80

C. \$31.50

D. \$36

E. \$54



15 Find the perimeter of the sector in the figure.

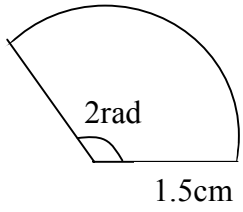
A. 2.25cm

B. 3cm

C. $\left(\frac{\pi}{60} + 3\right)$cm

D. 4.5cm

E. 6cm



16 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 $h : r$.

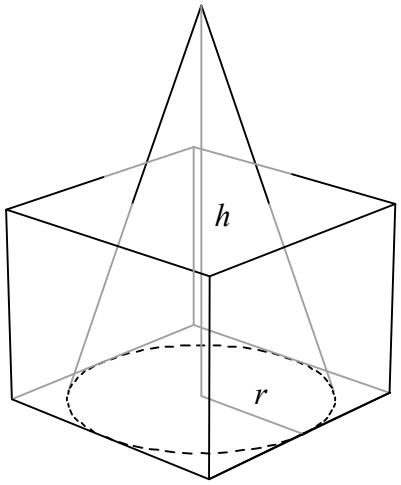
A. $24 : \pi$

B. $3 : 1$

C. $6 : \pi$

D. $3 : \pi$

E. $8 : 3\pi$



17 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

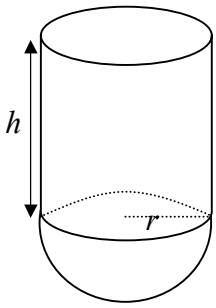
volume of cylinder : volume of hemisphere.

A. 1 : 3

B. 2 : 3

C. 3 : 4

D. 3 : 2



E. 3 : 1

18 A merchant marks his goods 25% above the cost. He allows 10% discount on the marked price for a cash sale. Find the percentage profit the merchant makes for a cash sale

A. 12.5%
B. 15%
C. 22.5%
D. 35%
E. 37.5%

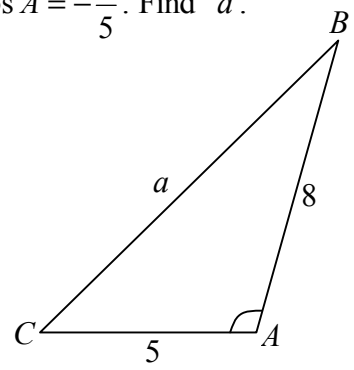
19 $\dfrac{\cos\theta}{1-\sin^2\theta}\times\dfrac{1-\cos^2\theta}{\sin\theta}=$

A. $\sin\theta$
B. $\cos\theta$
C. $\tan\theta$
D. $\dfrac{1}{\sin\theta}$
E. $\dfrac{1}{\cos\theta}$

20 $\cos^4\theta-\sin^4\theta+2\sin^2\theta=$

A. 0
B. 1
C. $(1-\sin^2\theta)^2$
D. $(1-\cos^2\theta)^2$
E. $(\cos^2\theta-\sin^2\theta)^2$

21 In the figure, $\cos A=-\dfrac{4}{5}$. Find a.

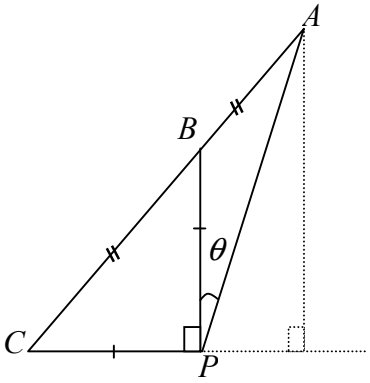


A. $\sqrt{153}$
B. $\sqrt{137}$
C. $\sqrt{89}$
D. $\sqrt{41}$
E. $\sqrt{25}$

22 The largest value of $3\sin^2\theta+2\cos^2\theta-1$ is

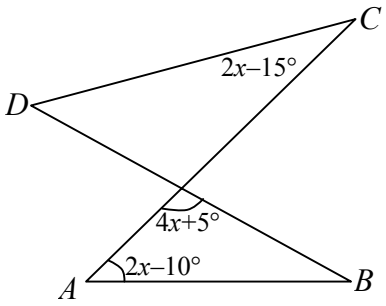
A. 1
B. $\dfrac{3}{2}$
D. 3

23 In the figure, $AB=BC$, $BP=CP$ and $BP\perp CP$. Find $\tan\theta$.



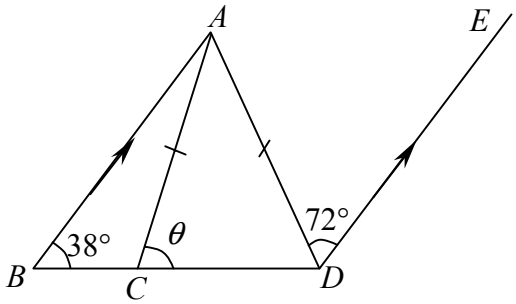
A. $\dfrac{1}{4}$
B. $\dfrac{1}{3}$
C. $\dfrac{1}{2}$
D. $\dfrac{1}{\sqrt{3}}$
E. $\dfrac{\sqrt{3}}{2}$

24 In the figure, points A, B, C and D are concyclic. Find x.



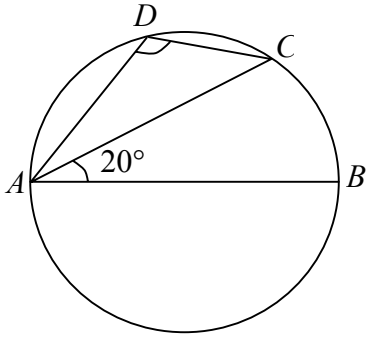
A. 20°
B. 22.5°
C. 25°
D. 27.5°
E. 30°

25 In the figure, $BA//DE$ and $AC=AD$. Find θ.



A. 34°
B. 54°
C. 70°
D. 72°
E. 76°

26 In the figure, AB is a diameter. Find $\angle ADC$.



A. 100°
B. 110°
C. 120°
D. 135°
E. 140°

27 If the point (1, 1), (3, 2) and (7, k) are on the same straight line, then k =

A. 3
B. 4
C. 6
D. 7
E. 10

28 $A(0, 0)$, $B(5, 0)$ and $C(2, 6)$ are the vertices of a triangle. P(9, 5), $Q(6, 6)$ and $R(2, -9)$ are three points. Which of the following triangles has/have area(s) greater than the area of ΔABC?

I. ΔABP
II. ΔABQ
III. ΔABR

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

29 A circle of radius 1 touches both the positive x-axis and the positive y-axis. Which of the following is/are true?

I. Its center is in the first quadrant.
II. Its center lies on the line $x - y = 0$.
III. Its center lies on the line $x + y = 1$.

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

30 What is the area of the circle $x^2 + y^2 - 10x + 6y - 2 = 0$?

A. 32π
B. 34π
D. 134π

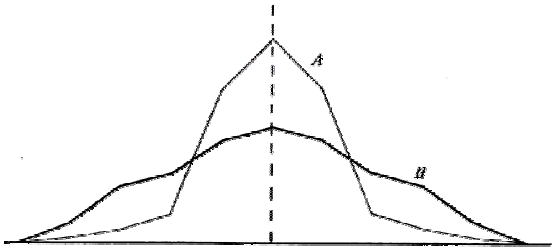
31 Two fair dice are thrown. What is the probability of getting a total of 5 or 10?

A. $\frac{1}{9}$
B. $\frac{5}{36}$
C. $\frac{1}{6}$
D. $\frac{7}{36}$
E. $\frac{2}{9}$

32 A group of n numbers has mean m. If the numbers 1, 2 and 6 are removed from the group, the mean of the remaining n–3 numbers remains unchanged. Find m.

A. 1
B. 2
C. 3
D. 6
E. $n - 3$

33



The figure shows the frequency polygons of two symmetric distributions A and B with the same mean. Which of the following is/are true?

I. Interquartile range of A<Interquartile range of B
II. Standard deviation of A>Standard deviation of B
III. Mode of A > Mode of B

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

34 If $9^{x+2} = 36$, then 3^x =

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

B. $\frac{4}{3}$ D. $\sqrt{6}$

C. 2 E. 9

35 If $a:b=2:3$ and $b:c=5:3$, then $\frac{a+b+c}{a-b+c}=$

A. –2

B. $\frac{5}{2}$ D. $\frac{17}{2}$

C. 4 E. 31

36

x	Sign of $f(x)$
3.56	+
3.58	-
3.57	+
3.575	+

From the table, a root of the equation $f(x)=0$ is

A. 3.57(correct to 3 sig.fig.).

B. 3.575(correct to 4 sig.fig.).

C. 3.5775(correct to 5 sig.fig.).

D. 3.5725(correct to 4 sig.fig.).

E. 3.58(correct to 3 sig.fig.).

37 Given that the positive numbers p, q, r, s are in G.S., which of the following must be true?

I. kp, kq, kr, ks are in G.S., where k is a non-zero constant.

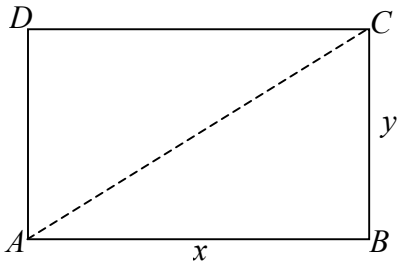
II. a^p, a^q, a^r, a^s are in G.S., where a is a positive constant.

III. $\log p, \log q, \log r, \log s$ are in A.S.

A. I only

B. II only

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



A. $\sqrt{32}$ cm

B. $\sqrt{34}$ cm

C. 7cm

D. $\sqrt{226}$ cm

E. $\sqrt{241}$ cm

39 In factorizing the expression $a^4+a^2b^2+b^4$, we find that

A. (a^2-b^2) is a factor.

B. (a^2+b^2) is a factor.

C. (a^2-ab-b^2) is a factor.

D. (a^2-ab+b^2) is a factor.

E. it cannot be factorized.

40 If the solution of the inequality $x^2-ax+6\le 0$ is $c\le x\le 3$, then

A. $a=5, c=2$

B. $a=-5, c=2$

C. $a=5, c=-2$

D. $a=1, c=-2$

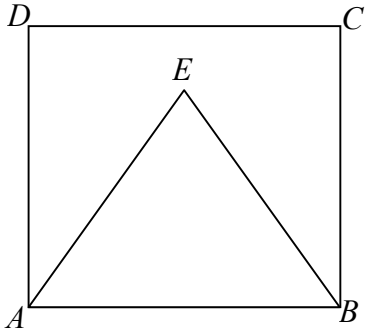
E. $a=-1, c=2$

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

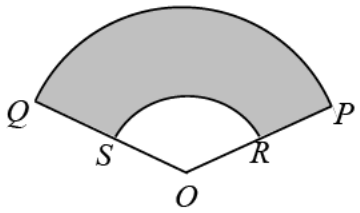
C. $\frac{\sqrt{3}}{8}$



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

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

42 In the figure, the radii of the sectors OPQ and ORS are 5cm and 3cm 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. $\frac{21}{25}$

43 Which of the following gives the compound interest on \$10000 at 6% p.a. for one year, compounded monthly?

A. $\$10000\times\frac{0.06}{12}\times 12$

B. $\$10000\left(1.06^{12}-1\right)$

C. $\$10000\left(1+\frac{0.06}{12}\right)^{12}$

D. $\$10000\left[\left(1+\frac{0.06}{12}\right)^{12}-1\right]$

E. $\$10000\left[\left(1+\frac{0.6}{12}\right)^{12}-1\right]$

44 Originally $\frac{2}{3}$ of the students in a class failed in an examination. After taking a re-examination, 40% of the failed students passed. Find the total pass percentage of the class.

45 Solve $\tan^4\theta+2\tan^2\theta-3=0$ for $0°\le\theta<360°$.

A. 45°, 135° only

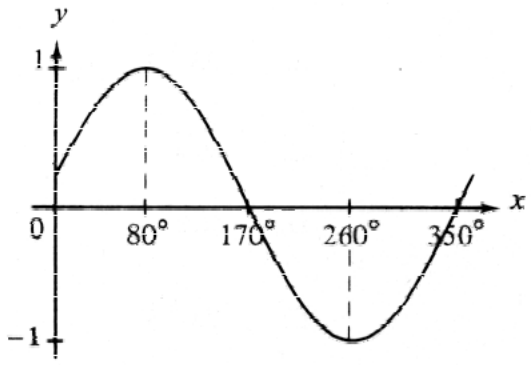
B. 45°, 225° only

C. 45°, 60°, 225°, 240°

D. 45°, 120°, 225°, 300°

E. 45°, 135°, 225°, 315°

46 The figure shows the graph of the function



A. $y=\sin(350°-x)$

B. $y=\sin(x+10°)$

C. $y=\cos(x+10°)$

D. $y=\sin(x-10°)$

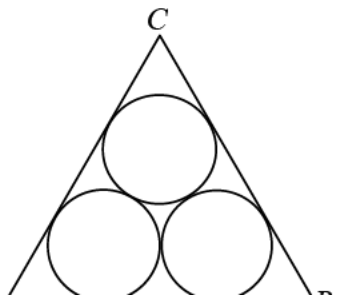
E. $y=\cos(x-10°)$

47 In the figure, ABC is an equilateral triangle and the radii of the three circles are each equal to 1. Find the perimeter of the triangle.

A. 12

B. $3(1+\tan 30°)$

C. $6(1+\tan 30°)$



D. $3\left(1+\dfrac{1}{\tan 30°}\right)$

E. $6\left(1+\dfrac{1}{\tan 30°}\right)$

48 In the figure, *ABCDEFGH* is a cuboid. The diagonal *AH* makes an angle θ with the base *ABCD*. Find $\tan\theta$

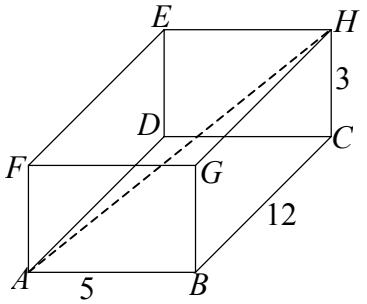
A. $\dfrac{3}{5}$

B. $\dfrac{3}{12}$

C. $\dfrac{3}{13}$

D. $\dfrac{3}{\sqrt{178}}$

E. $\dfrac{\sqrt{153}}{5}$



49 In the figure, if $arcBC : arcCA : arcAB = 1:2:3$, which of the following is/are true?

I. $\angle A : \angle B : \angle C = 1:2:3$

II. $a : b : c = 1:2:3$

III. $\sin A : \sin B : \sin C = 1:2:3$

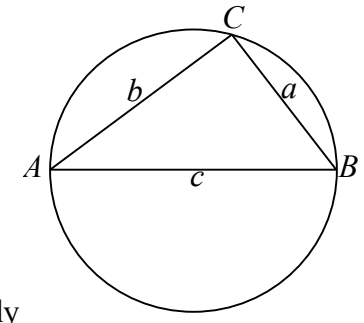
A. I only

B. II only

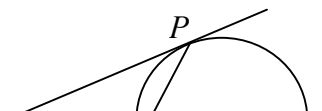
C. III only

D. I and II only

E. I, II and III only



50 In the figure, *TP* and *TQ* are tangents to the circle at *P* and *Q* respectively. If *M* is a point on the minor arc *PQ* and $\angle PMQ = \theta$, then $\angle PTQ =$



51 In the figure, *O* is the center of the circle. *AB* touches the circle at *N*. Which of the following is/are correct?

I. *M*, *N*, *K*, *O* are concyclic.

II. $\Delta HNB \sim \Delta NKB$

III. $\angle OAN = \angle NOB$

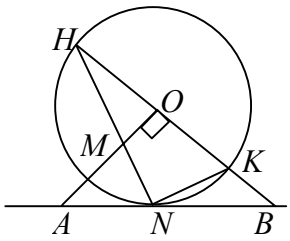
A. I only

B. II only

C. III only

D. I and II only

E. I, II and III



52 In the figure, *ABCD* and *EFGH* are two squares and *ACH* is an equilateral triangle.

Find *AB* : *EF*.

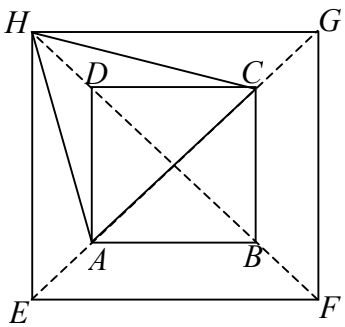
A. 1 : 2

B. 1 : 3

C. $1:\sqrt{2}$

D. $1:\sqrt{3}$

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



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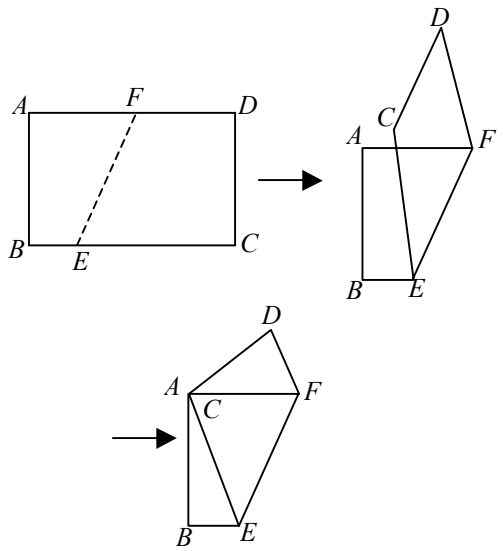

In the figure, a rectangular piece of paper $ABCD$ is folded along EF so that C and A coincide. If $AB = 12$ cm, $BC = 16$ cm, find BE.

A. 3.5cm

B. 4.5cm

C. 5cm

D. 8cm

E. 12.5cm

54 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 4cm, find the radii of the larger circles.

A. 8cm

B. 10cm

C. 12cm