

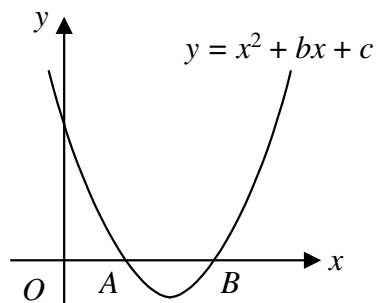
HKCEE 1987
Mathematics II

- 87
1. $\left(\frac{x+1}{x}\right)^2 - \left(\frac{x-1}{x}\right)^2 =$
- A. $\frac{2}{x}$
B. $\frac{4}{x}$
C. $\frac{2}{x^2}$
D. $\frac{4}{x^2}$
E. 0
- 87
2. If $\frac{1}{x} - \frac{1}{y} = \frac{1}{z}$, and $x = \frac{1}{2}$, $z = \frac{1}{3}$, then $y =$
- A. -1.
B. 1.
C. 5.
D. 6.
E. $\frac{1}{6}$.
- 87
3. If $a = \frac{b+3cd}{b-3cd}$, then $c =$
- A. $\frac{a}{6d}$.
B. $\frac{b}{3d}$.
C. $\frac{b(a-1)}{6d}$.
D. $\frac{b(a+1)}{a-1}$.
E. $\frac{b(a-1)}{3d(a+1)}$.
- 87
4. The radii of two solid spheres made of the same material are in the ratio 2 : 3. If the smaller sphere weight 16 kg, then the larger one weighs
- A. 24 kg.
B. 36 kg.
C. 48 kg.
D. 54 kg.
E. 60 kg.
- 87
5. Given that $x \neq 0$ and $-x, x, 3x^2$ are in G.P., find x .
- A. -1
B. $-\frac{1}{3}$
C. $\sqrt{3}$
D. $\frac{1}{3}$
E. 1
- 87
6. If $x + \frac{1}{x} = 1 + \sqrt{2}$, then $x^2 + \frac{1}{x^2} =$
- A. 1.
B. 3.
C. $1 + 2\sqrt{2}$.
D. $2 + 2\sqrt{2}$.
E. $3 + 2\sqrt{3}$.
- 87
7. If $3^{2k} + 1 = 3^{2k} + 6$, then $k =$
- A. $-\frac{1}{4}$.
B. $-\frac{1}{2}$.
C. $\frac{1}{4}$.
D. $\frac{1}{2}$.
E. 3.

- 87 When the expression $x^2 + px + q$ is divided by $x + 1$, the remainder is 4. Find the value of $2p - 2q + 1$.

- A. -3
 B. -5
 C. -7
 D. -9
 E. It cannot be determined.

87
9.



In the figure, the graph of $y = x^2 + bx + c$ cuts the x-axis at A and B. $OA + OB =$

- A. b
 B. c
 C. $-b$
 D. $-c$
 E. $-\frac{b}{c}$

- 87 If $f(x) = x^2 + 1$, then $f(x - 1) =$

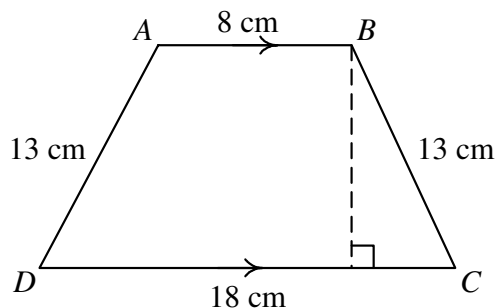
- A. x^2 .
 B. $x^2 - 1$.
 C. $x^2 + 2$.
 D. $x^2 - 2x$.
 E. $x^2 - 2x + 2$.

- 87 If $\log_{10}x, \log_{10}y, \log_{10}z$ are in A.P., then

- A. $y = 10^{\frac{x+z}{2}}$.
 B. $y = \frac{x+z}{2}$.
 C. $y^2 = x + z$.
 D. $y^2 = xz$.

E. $y = 10^{\sqrt{xz}}$.

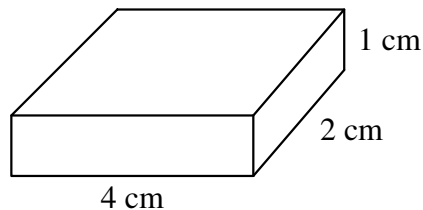
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12.



$ABCD$ is a trapezium in which $AB \parallel DC$, $AB = 8$ 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

87
13.



A solid rectangular iron block, $4\text{ cm} \times 2\text{ cm} \times 1\text{ cm}$, 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 .

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14.

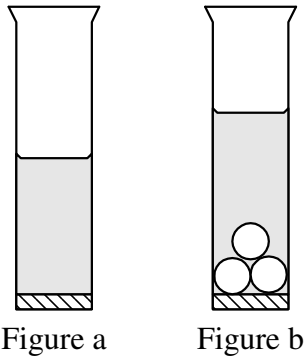


Figure a shows a circular measuring cylinder 4 cm in diameter containing water. Three iron balls, each of diameter 2 cm, are dropped into the cylinder as shown in Figure b. What is the rise in the water level?

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

87 Find, correct to the nearest dollar, the
15. compound interest on \$10 000 at 8% p.a. for 4 years, compounded half-yearly.

- A. \$3200
- B. \$3605
- C. \$3686
- D. \$13 200
- E. \$13 686

87 If the selling price of 5 pens is the same
16. as the cost price of 6 pens, the percentage profit in selling a pen will be

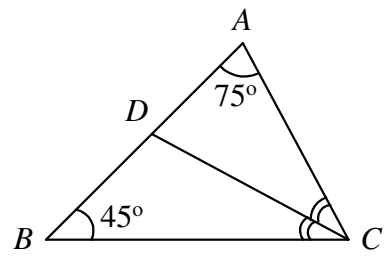
- A. $16\frac{2}{3}\%$.
- B. 20%.
- C. 60%.

- D. $116\frac{2}{3}\%$.
- E. 120%.

87 The circumference of a circle is
17. 6π cm. The length of an arc of the circle which subtends an angle of $\frac{1}{3}$ radian at the centre is

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

87
18.



In the figure, $\angle A = 75^\circ$, $\angle B = 45^\circ$ and CD bisects $\angle ACB$. $\frac{BD}{CD}$

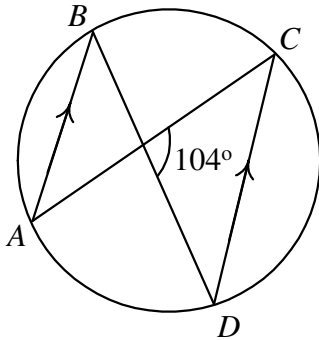
- A. $\frac{2}{3}$.
- B. $\frac{1}{\sqrt{2}}$.
- C. $\sqrt{2}$.
- D. $\sqrt{\frac{2}{3}}$.
- E. $\sqrt{\frac{3}{2}}$.

87 A rectangle is 6 cm long and 8 cm
19. wide. The acute angle between its diagonals, correct to the nearest degree is

- A. 37° .
- B. 41° .

- C. 49° .
- D. 74° .
- E. 83° .

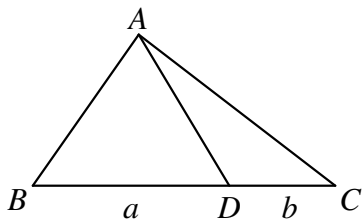
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20.



In the figure, chords AC and BD meet at E and $AB \parallel DC$. If $\angle CED = 104^\circ$, find $\angle ABD$.

- A. 76°
- B. 52°
- C. 38°
- D. 14°
- E. It cannot be determined.

87
21.



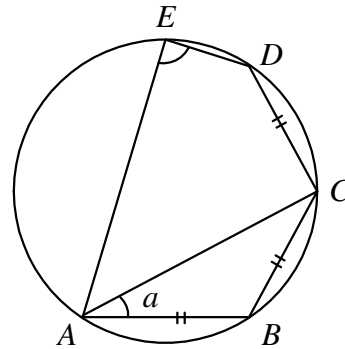
In the figure, $BD = a$. $DC = b$ and the area of $\triangle ABC$.

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

87 The real number π is
22.

- A. $\frac{22}{7}$.
- 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.

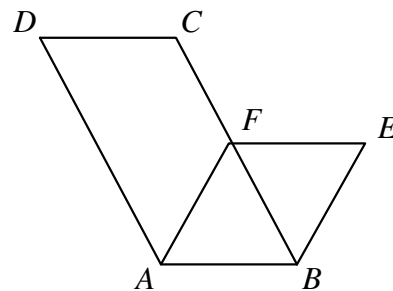
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23.



In the figure, AB , BC and CD are three equal chords of a circle. If $\angle BAC = a$, then $\angle AED =$

- A. $2a$.
- B. $3a$.
- C. $90^\circ - a$.
- D. $180^\circ - 2a$.
- E. $180^\circ - 3a$.

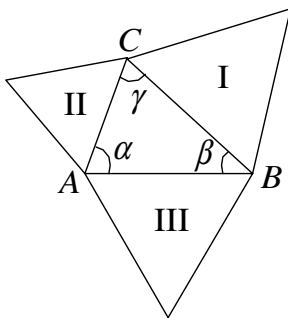
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24.



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

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

87
25.



In the figure, I, II and III are equilateral triangles.

Area of I : Area of II : Area of III =

- A. $\alpha : \beta : \gamma$.
 B. $\sin \alpha : \sin \beta : \sin \gamma$.
 C. $\sin^2 \alpha : \sin^2 \beta : \sin^2 \gamma$.
 D. $\cos \alpha : \cos \beta : \cos \gamma$.
 E. $\cos^2 \alpha : \cos^2 \beta : \cos^2 \gamma$.

87 Which of the following straight lines
26. divide(s) the circle
 $(x - 1)^2 + (y + 1)^2 = 1$ into two equal parts?

- I. $x - y - 2 = 0$
 II. $x + y + 2 = 0$
 III. $x - y + 2 = 0$

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

87 The equation of a circle is
27. $x^2 + y^2 - 4x + 2y + 1 = 0$. Which of the following is/are true?

- I. The centre is $(-2, 1)$.
 II. The radius is 2 units.
 III. The circle intersects the y-axis at two distinct points.

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

87 Two perpendicular lines $kx + y - 4 = 0$
28. and $x - 2y + 3 = 0$ intersect at the point (h, k) . Find h and k .

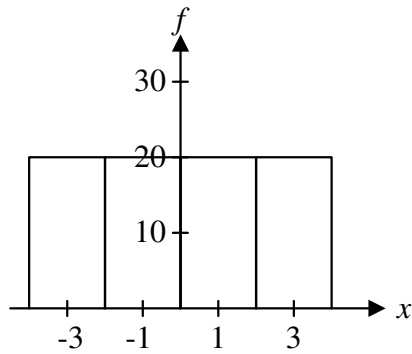
- A. $h = -7, k = -2$
 B. $h = -2, k = \frac{1}{2}$
 C. $h = 1, k = 2$
 D. $h = -4, k = -\frac{1}{2}$
 E. $h = -3, k = 2$

87 If the median of the 5 different integers
29. 2, 7, 10, x , $2x - 3$ is 7, then $x =$

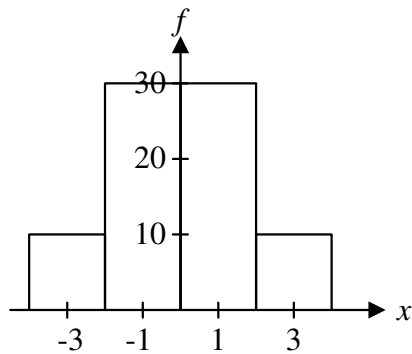
- A. 3 .
 B. 4 .
 C. 5 .
 D. 6 .
 E. 8 .

87 The figures show the histograms of the
30. three frequency distributions. Arrange their standard deviations in ascending order of magnitude.

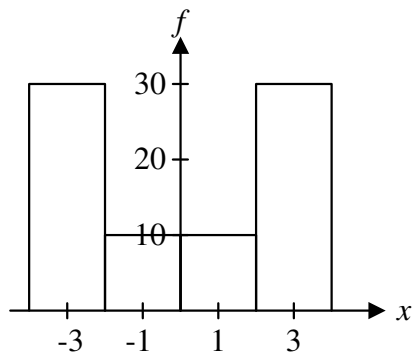
I.



II.



III.



- A. I, II, III
- B. I, III, II
- C. II, I, III
- D. II, III, I
- E. III, II, I

87 One letter is taken from each of the words "MAN" and "ART" at random.
31. Find the probability that the two letters are not the same.

- A. $\frac{1}{9}$
- B. $\frac{1}{3}$
- C. $\frac{4}{9}$

- D. $\frac{2}{3}$
- E. $\frac{8}{9}$

87 Four persons A, B, C, D sit randomly around a round table.
32. The probability that A sits next to B is

- A. $\frac{1}{4}$.
- B. $\frac{1}{3}$.
- C. $\frac{1}{2}$.
- D. $\frac{2}{3}$.
- E. $\frac{5}{6}$.

87 A die is thrown twice. Find the probability that the number obtained at the first throw is greater than that at the second throw.
33.

- A. $\frac{1}{6}$
- B. $\frac{5}{12}$
- C. $\frac{1}{2}$
- D. $\frac{7}{12}$
- E. $\frac{5}{6}$

87 If $a : b = 3 : 2, b : c = 4 : 3$, then $a + b :$
34. $b + c =$

- A. $7 : 10$.
- B. $5 : 7$.
- C. $1 : 1$.
- D. $7 : 5$.
- E. $10 : 7$.

87 Peter bought an article for \$ x . He sold
35. it to Mary at a profit of 20%. Mary
then sold it to John for \$90 at a loss of
25%. Find x .

- A. 56.25
- B. 81
- C. 90
- D. 100
- E. 144

87 If x and y are integers with $x > y$, which
36. of the following is/are true?

- I. $x^2 > y^2$
- II. $\frac{1}{x} < \frac{1}{y}$
- III. $10^x > 10^y$

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

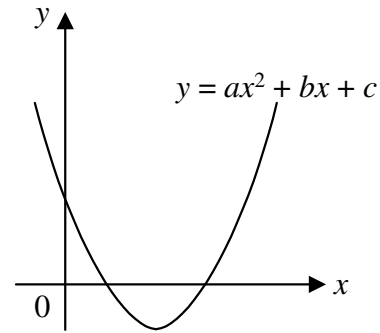
87 Solve the inequality
37. $x \log_{10} 0.1 > \log_{10} 10$.

- A. $x > -1$
- B. $x > 1$
- C. $x > 100$
- D. $x < 1$
- E. $x < -1$

87 If $x^2 + y^2 = 5$ and $x + y = 3$, then $x - y =$
38.

- A. 1 .
- B. -1 .
- C. 1 or -1 .
- D. 1 or -5 .
- E. -1 or 5 .

87
39.



The figure shows the graph of
 $y = ax^2 + bx + c$. Which of the
following is/are true?

- I. $a > 0$
- II. $b > 0$
- III. $c > 0$

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

87 Find the H.C.F. of $(2x - 1)(x^2 - 6x + 9)$
40. and $(x^2 - 3x)(4x^2 - 1)$.

- A. $(x - 3)$
- B. $(2x - 1)$
- C. $(x - 3)(2x - 1)$
- D. $x(x - 3)^2(2x - 1)(2x + 1)$
- E. There is no H.C.F.

87 If a is 10% less than b and b is 10%
41. greater than c , then $a : c =$

- A. 1 : 1 .
- B. 9 : 10 .
- C. 10 : 9 .
- D. 99 : 100 .
- E. 100 : 99 .

87
42. If $3a = 2b = 5c$, then $\frac{1}{a} : \frac{1}{b} : \frac{1}{c} =$

- A. 3 : 2 : 5 .
- B. 5 : 2 : 3 .

- C. $\frac{1}{3} : \frac{1}{2} : \frac{1}{5}$.
 D. $\frac{1}{5} : \frac{1}{3} : \frac{1}{2}$.
 E. $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$.

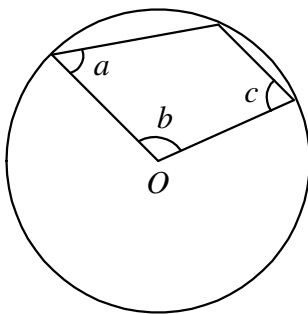
87 43. A man walks from place A to place B at a speed of 3 km/h and cycles immediately back to place A along the same road at a speed of 15 km/h. The average speed for the whole trip is

- A. 5 km/h.
 B. 6 km/h.
 C. 9 km/h.
 D. 10 km/h.
 E. 12 km/h.

87 44. Let n be a positive integer. Which of the following number is/are odd?

- I. 2^{2n+1}
 II. $2^n + 1$
 III. $3(2^n)$
- A. I only
 B. II only
 C. III only
 D. II and III only
 E. I, II and III

87 45.

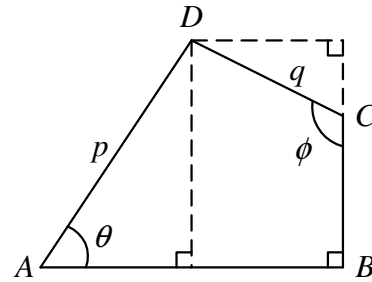


In the figure, O is the center of the circle. $a + b =$

- A. 180° .
 B. c .
 C. $\frac{c}{2}$.

- D. $180^\circ - c$.
 E. $180^\circ - \frac{c}{2}$.

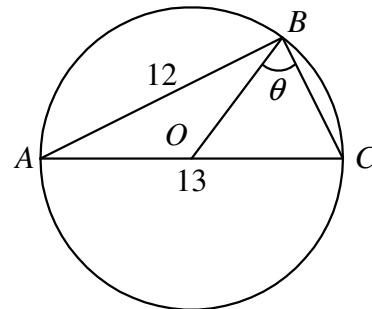
87 46.



In the figure, $AD = p$, $CD = q$ and $\angle B = 90^\circ$, $BC =$

- A. $p \sin \theta - q \sin \phi$.
 B. $p \sin \theta - q \cos \phi$.
 C. $p \cos \theta - q \sin \phi$.
 D. $p \sin \theta + q \cos \phi$.
 E. $p \cos \theta + q \sin \phi$.

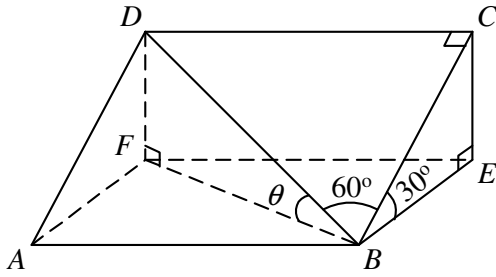
87 47.



In the figure, O is the centre of the circle. If $AB = 12$ and $AC = 13$, then $\cos \theta =$

- A. $\frac{5}{12}$.
 B. $\frac{5}{13}$.
 C. $\frac{12}{13}$.
 D. $\frac{12}{25}$.
 E. $\frac{13}{25}$.

87
48.



In the figure, $ABCD$ is a rectangle inclined at an angle of 30° to the horizontal plane $ABEF$. $\angle CBD = 60^\circ$. Let θ be the inclination of BD to the horizontal plane. $\sin \theta =$

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

87 How many different values of x
49. between 0° and 360° will satisfy the equation $(\sin x + 1)(2 \sin x + 1) = 0$?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

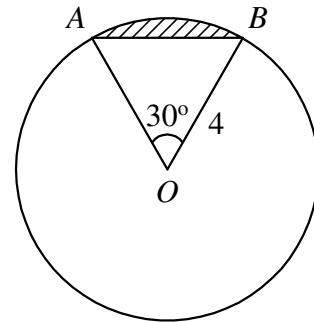
87 If $0^\circ \leq x < 360^\circ$, the number of points of
50. intersection of the graph of $y = \sin x$ and $y = 1 + \cos x$ is

- A. 0.
- B. 1.
- C. 2.
- D. 3.
- E. 4.

87 In $\triangle ABC$, if $AB : BC : CA = 4 : 5 : 6$,
51. then $\cos A =$

- A. $\frac{1}{8}$.
- B. $\frac{1}{5}$.
- C. $\frac{3}{10}$.
- D. $\frac{9}{16}$.
- E. $\frac{3}{4}$.

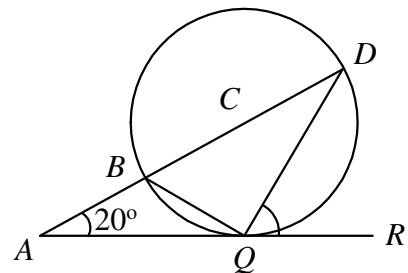
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52.



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. $\frac{8\pi}{3} - 8$.

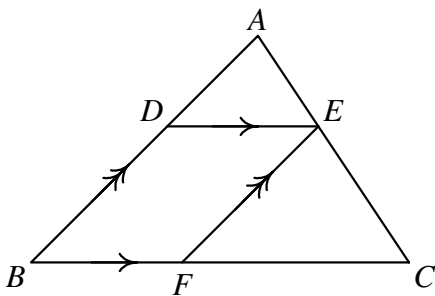
87
53.



In the figure, C is the centre of the circle. $ABCD$ is a straight line. AQR touches the circle at Q . If $\angle DAR = 20^\circ$, then $\angle DQR =$

- A. 35° .
- B. 40° .
- C. 55° .
- D. 65° .
- E. 70° .

87
54.



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

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