

## HKDSE MATH Core Practice Paper II

### 1. HKDSE MATH Core Practice Paper II Q1

$$x^3(2x + x) =$$

- A.  $3x^4$ .
- B.  $2x^5$ .
- C.  $3x^5$ .
- D.  $2x^6$ .

### 2. HKDSE MATH Core Practice Paper II Q2

If  $3a + 1 = 3(b - 2)$ , then  $b =$

- A.  $a + 1$ .
- B.  $a + 3$ .
- C.  $a + \frac{7}{3}$ .
- D.  $a - \frac{5}{3}$ .

### 3. HKDSE MATH Core Practice Paper II Q3

$$p^2 - q^2 - p - q =$$

- A.  $(p + q)(p - q - 1)$ .
- B.  $(p + q)(p + q - 1)$ .
- C.  $(p - q)(p - q + 1)$ .
- D.  $(p - q)(p + q - 1)$ .

### 4. HKDSE MATH Core Practice Paper II Q4

Let  $m$  and  $n$  be constants. If  $m(x - 3)^2 + n(x + 1)^2 \equiv x^2 - 38x + 41$ , then  $m =$

- A.  $-4$ .
- B.  $-1$ .
- C.  $3$ .
- D.  $5$ .

### 5. HKDSE MATH Core Practice Paper II Q5

Let  $f(x) = x^4 - x^3 + x^2 - x + 1$ . When  $f(x)$  is divided by  $x + 2$ , the remainder is

- A.  $-2$ .
- B.  $0$ .
- C.  $11$ .

D. 31.

**6. HKDSE MATH Core Practice Paper II Q6**

Let  $k$  be a constant. If the quadratic equation  $3x^2 + 2kx - k = 0$  has equal roots, then  $k =$

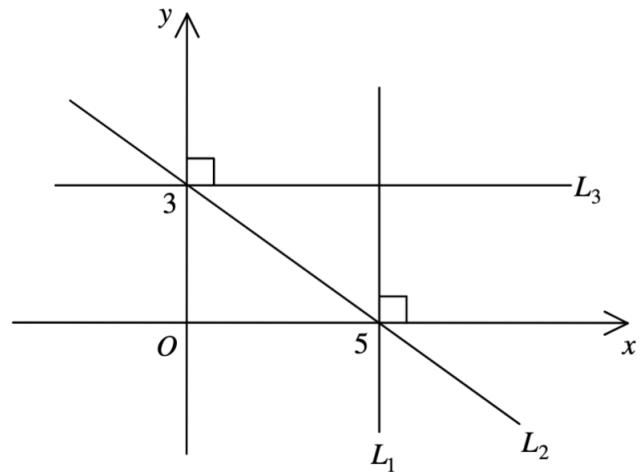
- A.  $-3$ .
- B.  $3$ .
- C.  $-3$  or  $0$ .
- D.  $0$  or  $3$ .

**7. HKDSE MATH Core Practice Paper II Q7**

In the figure, the  $x$ -intercept of the straight lines  $L_1$  and  $L_2$  are 5 while the  $y$ -intercepts of the straight lines  $L_2$  and  $L_3$  are 3. Which of the following are true?

- I. The solution of the inequality  $f(x) > k$  is  $x < 1$  or  $x > 7$ .
- II. The roots of the equation  $f(x) = k$  are 1 and 7.
- III. The equation of the axis of symmetry of the quadratic graph of  $y = f(x)$  is  $x = 3$ .

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

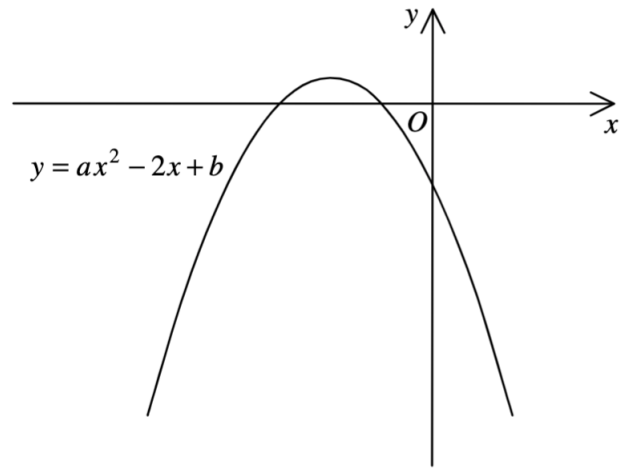


**8. HKDSE MATH Core Practice Paper II Q8**

The figure shows the graph of  $y = ax^2 - 2x + b$ , where  $a$  and  $b$  are constants. Which of the following is/are true?

- I.  $a > 0$
- II.  $b < 0$
- III.  $ab < 1$

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



**9. HKDSE MATH Core Practice Paper II Q9**

The solution of  $4x > x - 3$  or  $3 - x < x + 7$  is

- A.  $x > -2$ .
- B.  $x < -2$ .
- C.  $x > -1$
- D.  $x < -2$  or  $x > -1$ .

**10. HKDSE MATH Core Practice Paper II Q10**

John buys a vase for \$1600. He then sells the vase to Susan at a profit of 20%. At what price should Susan sell the vase in order to have a profit of 20%?

- A. \$2240
- B. \$2304
- C. \$2400
- D. \$2500

**11. HKDSE MATH Core Practice Paper II Q11**

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%.

**12. HKDSE MATH Core Practice Paper II Q12**

Let  $\alpha$  and  $\beta$  be non-zero constants. If  $(\alpha + \beta) : (3\alpha - \beta) = 7 : 3$ , then  $\alpha : \beta =$

- A. 5 : 9.
- B. 9 : 5.

C. 19 : 29.

D. 29 : 19.

**13. HKDSE MATH Core Practice Paper II Q13**

If  $z$  varies directly as  $x$  and inversely as  $y^2$ , which of the following must be constant?

A.  $\frac{x}{y^2z}$

B.  $\frac{z}{xy^2}$

C.  $\frac{yz}{x^2}$

D.  $\frac{xz}{y^2}$

**14. HKDSE MATH Core Practice Paper II Q14**

0.009049999 =

A. 0.00905 (correct to 3 decimal places).

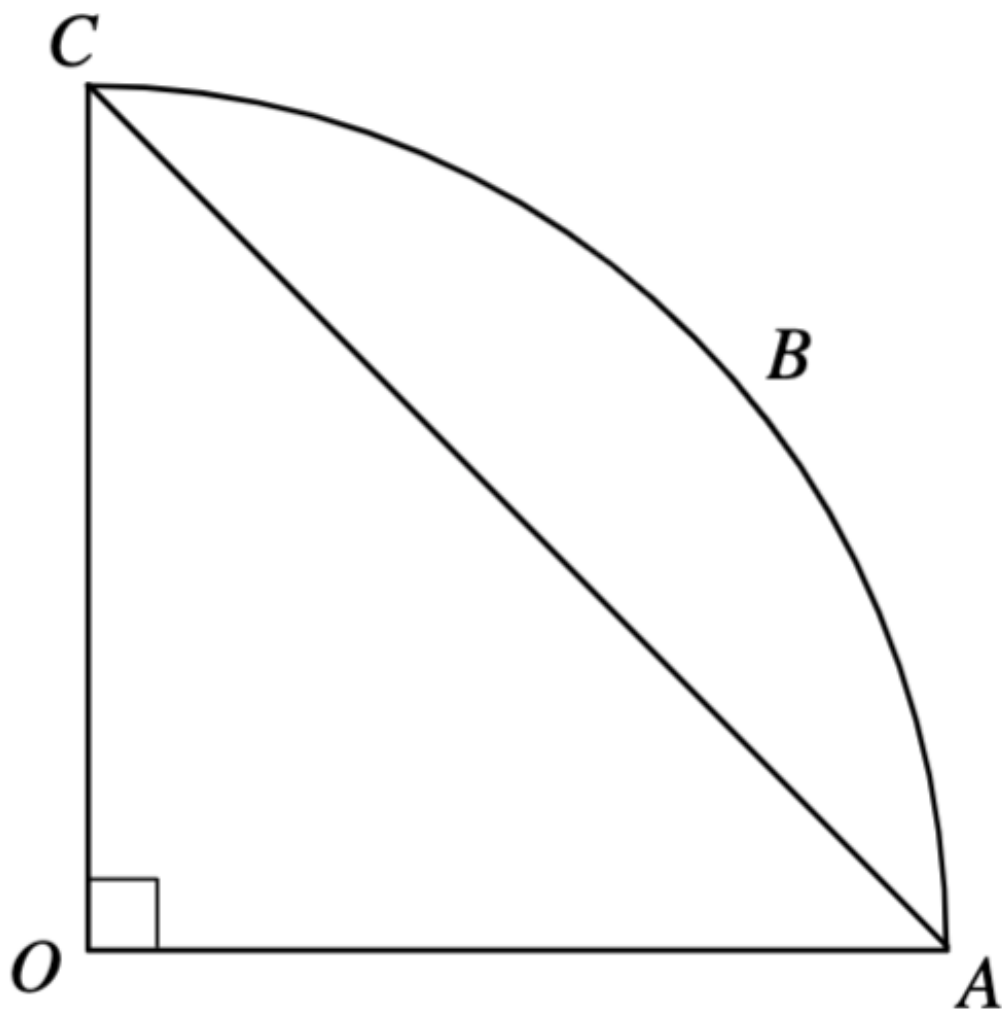
B. 0.00905 (correct to 3 significant figures).

C. 0.00905 (correct to 6 decimal places).

D. 0.00905 (correct to 6 significant figures).

**15. HKDSE MATH Core Practice Paper II Q15**

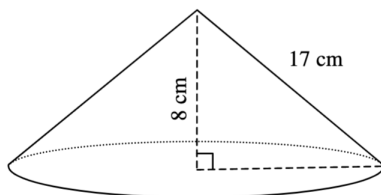
In the figure,  $O$  is the centre of the sector  $OABC$ . If the area of  $\triangle OAC$  is  $12 \text{ cm}^2$ , find the area of the segment  $ABC$ .



- A. 0.8%
- B. 2.3%
- C. 4.7%
- D. 6.3%

16. HKDSE MATH Core Practice Paper II Q16

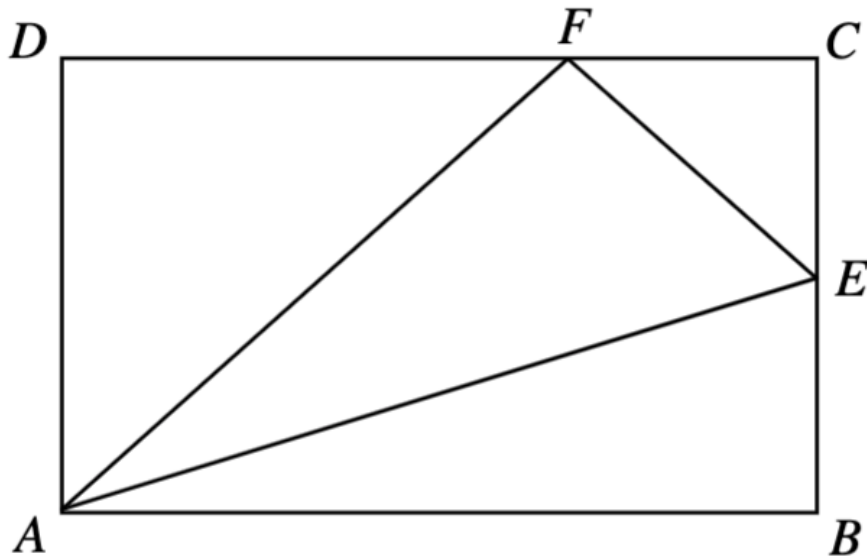
In the figure,  $O$  is the centre of the circle.  $C$  and  $D$  are points lying on the circle.  $OBC$  and  $BAD$  are straight lines. If  $OC = 20$  cm and  $OA = AB = 10$  cm, find the area of the shaded region  $BCD$  correct to the nearest  $\text{cm}^2$ .



- A.  $214 \text{ cm}^2$
- B.  $230 \text{ cm}^2$
- C.  $246 \text{ cm}^2$
- D.  $270 \text{ cm}^2$

17. **HKDSE MATH Core Practice Paper II Q17**

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

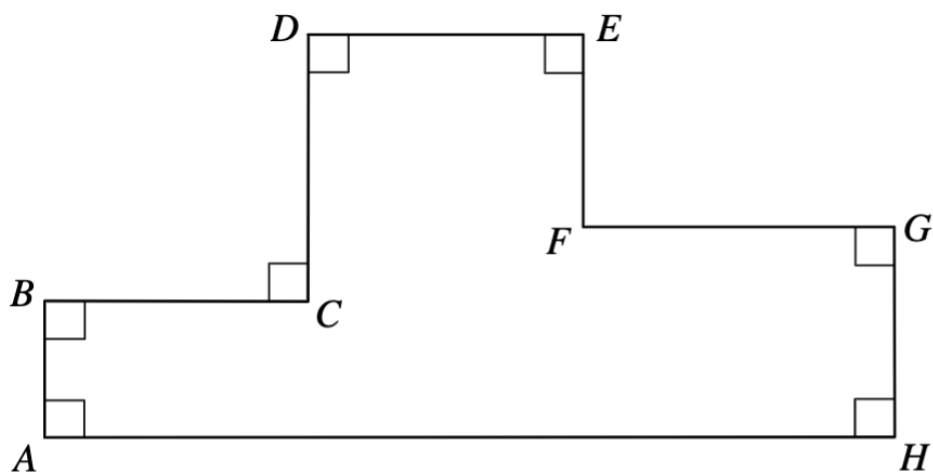


Which of the following is true?

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

18. **HKDSE MATH Core Practice Paper II Q18**

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  $CD = 9 \text{ cm}$  and  $AT : TB = 1 : 2$ . If the area of the parallelogram  $ABCD$  is  $36 \text{ cm}^2$ , then the perimeter of the parallelogram  $ABCD$  is



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

19. **HKDSE MATH Core Practice Paper II Q19**

$$\frac{\sin \theta}{\cos 60^\circ} + \frac{\cos (270^\circ - \theta)}{\tan 45^\circ} =$$

- A.  $\sin \theta$ .
- B.  $3 \sin \theta$ .
- C.  $2 \sin \theta - \cos \theta$ .
- D.  $2 \sin \theta + \cos \theta$ .

20. **HKDSE MATH Core Practice Paper II Q20**

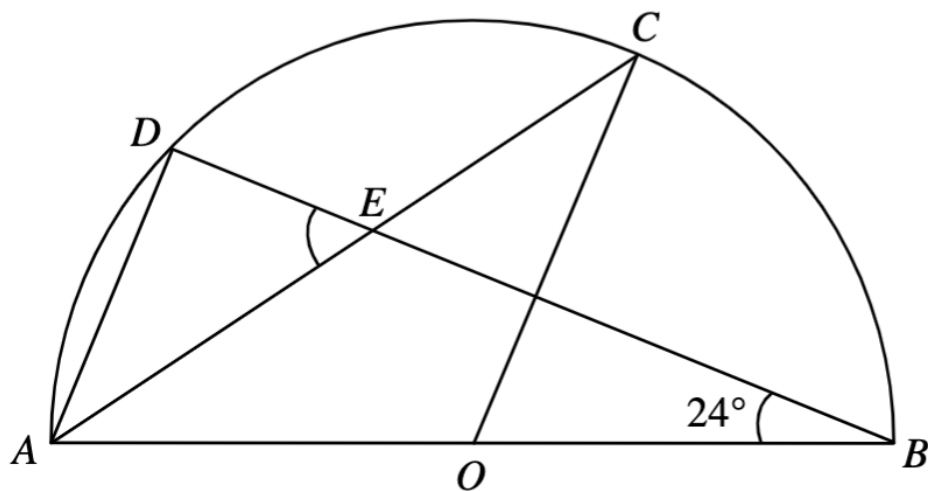
In the figure,  $AB = 1$  cm,  $BC = CD = DE = 2$  cm and  $EF = 3$  cm. Find the distance between  $A$  and  $F$  correct to the nearest 0.1 cm.

PPFigure2.20.png

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

21. **HKDSE MATH Core Practice Paper II Q21**

In the figure,  $ABCD$  is a semi-circle. If  $BC = CD$ , then  $\angle ADC =$





- A.  $118^\circ$ .
- B.  $121^\circ$ .
- C.  $124^\circ$ .
- D.  $126^\circ$ .

**22. HKDSE MATH Core Practice Paper II Q22**

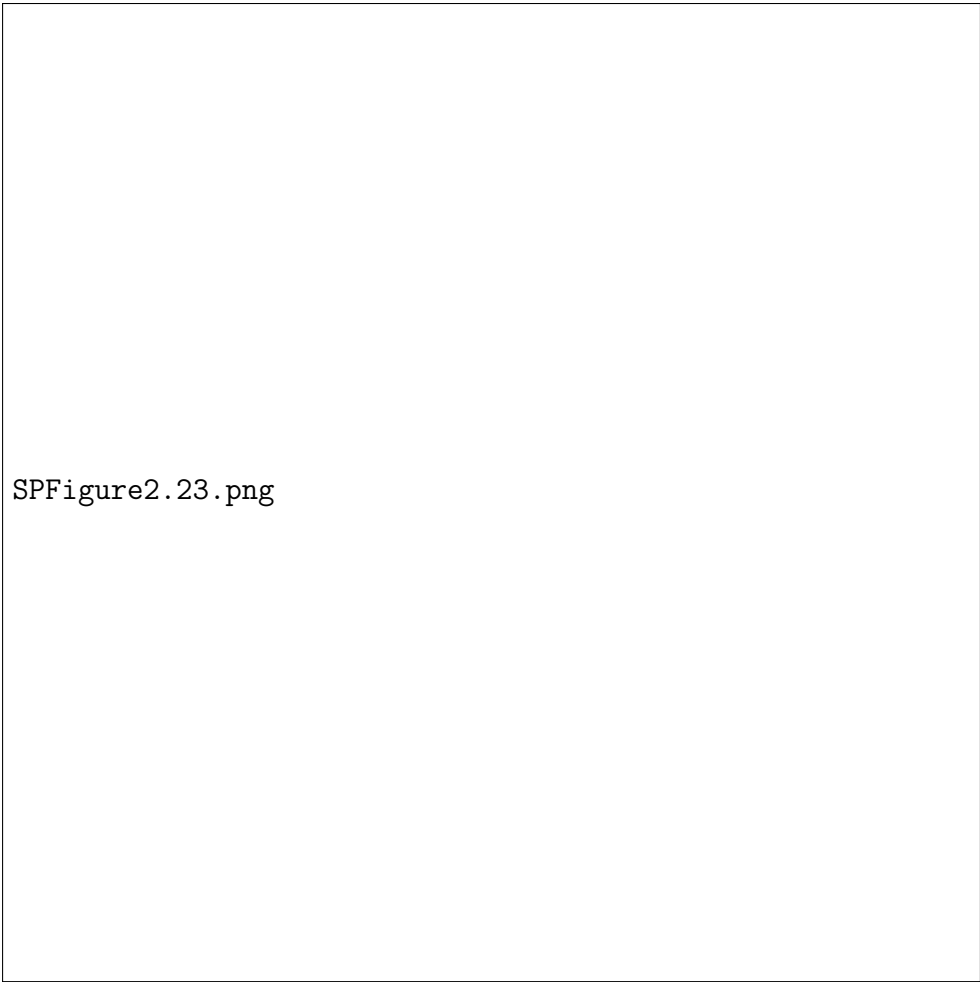
In the figure,  $O$  is the centre of the circle  $ABCDE$ . If  $\angle ABE = 30^\circ$  and  $\angle CDE = 105^\circ$ , then  $\angle AOC =$



- A.  $120^\circ$ .
- B.  $135^\circ$ .
- C.  $150^\circ$ .
- D.  $165^\circ$ .

**23. HKDSE MATH Core Practice Paper II Q23**

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  $AF : BC =$

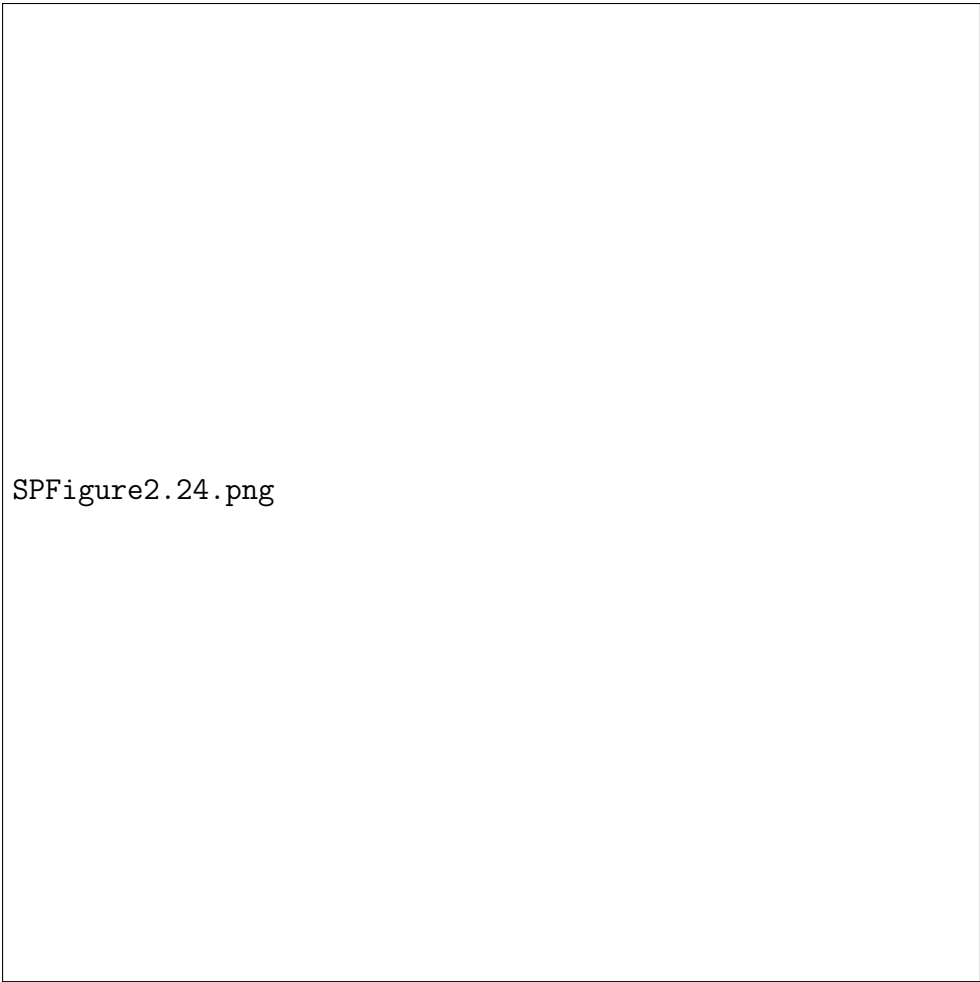


SPFigure2.23.png

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

**24. HKDSE MATH Core Practice Paper II Q24**

In the figure,  $ABC$  is a straight line. If  $BD = CD$  and  $AB = 10$  cm, find  $BC$  correct to the nearest cm.

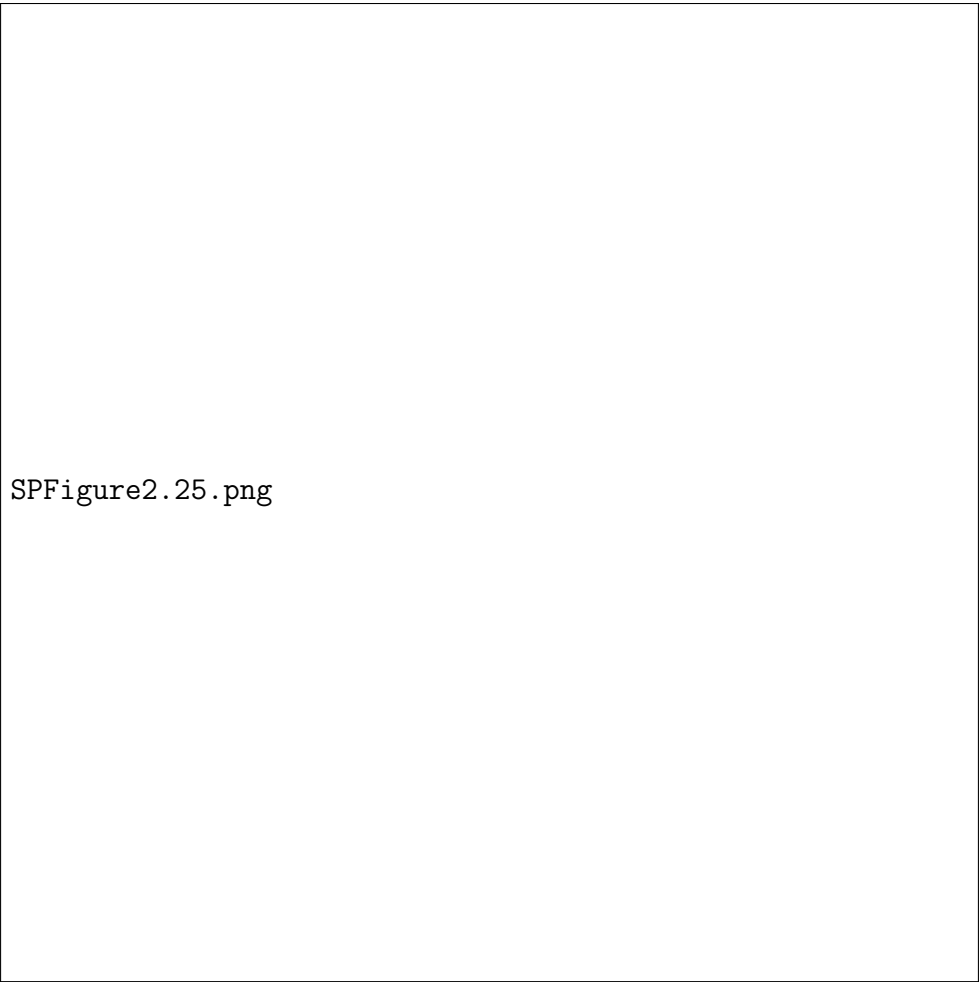


SPFigure2.24.png

- A. 8 cm
- B. 13 cm
- C. 14 cm
- D. 15 cm

**25. HKDSE MATH Core Practice Paper II Q25**

In the figure, the two 6-sided polygons show



SPFigure2.25.png

- A. a rotation transformation.
- B. a reflection transformation.
- C. a translation transformation.
- D. a dilation transformation.

**26. HKDSE MATH Core Practice Paper II Q26**

If the point  $(-4, 3)$  is rotated anti-clockwise about the origin through  $180^\circ$ , then the coordinates of its image are

- A.  $(-3, -4)$ .
- B.  $(3, 4)$ .
- C.  $(-4, -3)$ .
- D.  $(4, -3)$ .

**27. HKDSE MATH Core Practice Paper II Q27**

The box-and-whisker diagram below shows the distribution of the scores (in marks) of the students of a class in a test.

SPFigure2.27.png

If the passing score of the test is 50 marks, then the passing percentage of the class is

- A. 25%.
- B. 50%.
- C. 70%.
- D. 75%.

**28. HKDSE MATH Core Practice Paper II Q28**

The stem-and-leaf diagram below shows the distribution of heights (in cm) of 23 staff members in an office. Find the median of the distribution.

Stem (tens)	Leaf (units)
15	3 3 4 5 6 7 9
16	1 2 2 3 5 6 6 8
17	1 2 6 7 9
18	2 6 7

- A. 164 cm
- B. 165 cm
- C. 165.5 cm

D. 166 cm

**29. HKDSE MATH Core Practice Paper II Q29**

$\{a - 7, a - 1, a, a + 2, a + 4, a + 8\}$  and  $\{a - 9, a - 2, a - 1, a + 3, a + 4, a + 6\}$  are two groups of numbers. Which of the following is/are true?

- I. The two groups of numbers have the same mean.
- II. The two groups of numbers have the same median.
- III. The two groups of numbers have the same range.

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

**30. HKDSE MATH Core Practice Paper II Q30**

The students' union of a school of 950 students wants to investigate the opinions of students in the school on the services provided by the tuck shop. A questionnaire is designed by the students' union and only the chairperson and vice-chairperson of the students' union are selected as a Practice to fill in the questionnaire. Which of the following are the disadvantages of this sampling method?

- I. The Practice size is very small.
- II. Not all students in the school are selected.
- III. Not all students in the school have an equal chance of being selected.

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

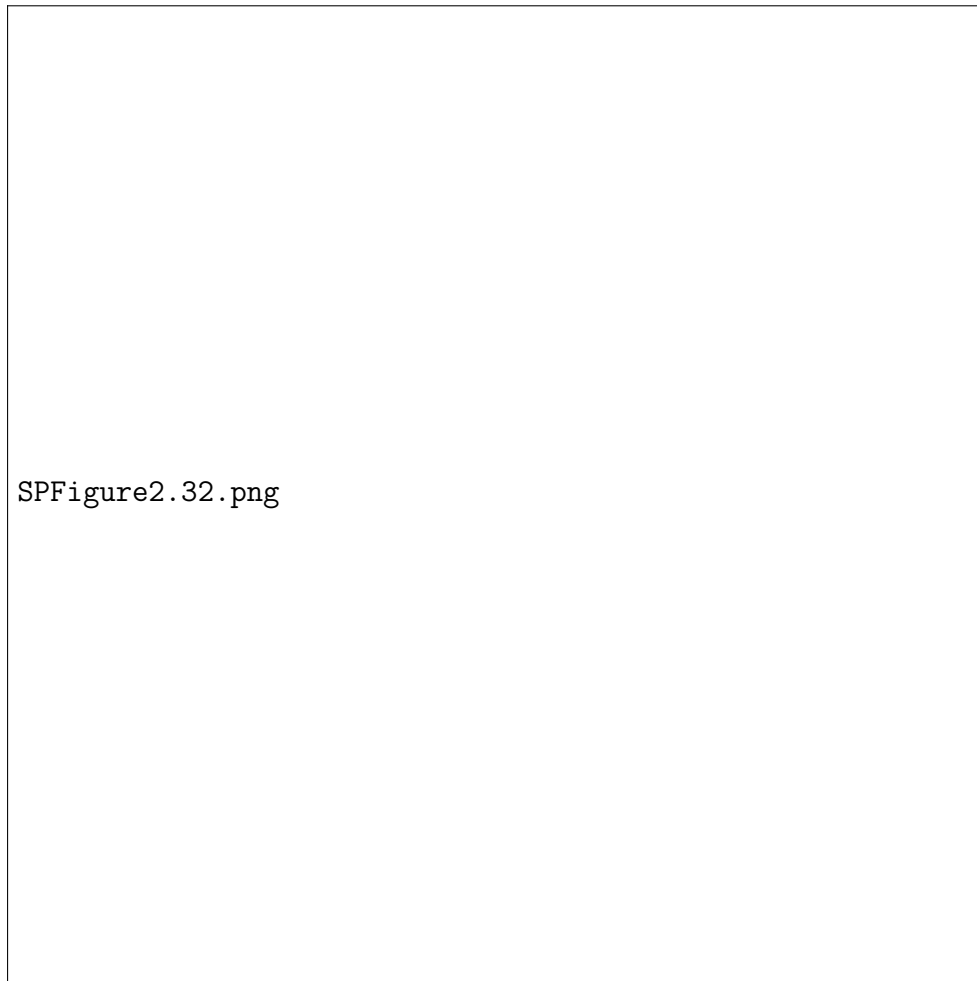
**31. HKDSE MATH Core Practice Paper II Q31**

$$\frac{1}{2-x} + \frac{x-1}{(x-2)^2} =$$

- A.  $\frac{-2}{(2-x)^2}$ .
- B.  $\frac{1}{(2-x)^2}$ .
- C.  $\frac{-2x+3}{(2-x)^2}$ .
- D.  $\frac{2x-3}{(2-x)^2}$ .

32. HKDSE MATH Core Practice Paper II Q32

The graph in the figure shows the linear relation between  $x$  and  $\log_5 y$ . If  $y = ab^x$ , then  $a =$



- A. 1.
- B. 2.
- C. 5.
- D. 25.

33. HKDSE MATH Core Practice Paper II Q33

$1010010001001_2 =$

- A.  $2^{12} + 2^{10} + 137$ .
- B.  $2^{12} + 2^{10} + 273$ .
- C.  $2^{13} + 2^{11} + 137$ .
- D.  $2^{13} + 2^{11} + 273$ .

34. HKDSE MATH Core Practice Paper II Q34

If  $k$  is a real number, then  $4k - \frac{6 + ki}{i} =$

- A.  $3k + 6i$ .

- B.  $3k - 6i$ .
- C.  $5k + 6i$ .
- D.  $5k - 6i$ .

**35. HKDSE MATH Core Practice Paper II Q35**

Which of the triangular regions in the figure may represent the solution of  $\begin{cases} 0 \leq x \leq 6 \\ 0 \leq y \leq 3 \\ x \leq 2y \end{cases}$ ?

- A.  $\triangle OAC$
- B.  $\triangle OBD$
- C.  $\triangle OCE$
- D.  $\triangle ODF$

**36. HKDSE MATH Core Practice Paper II Q36**

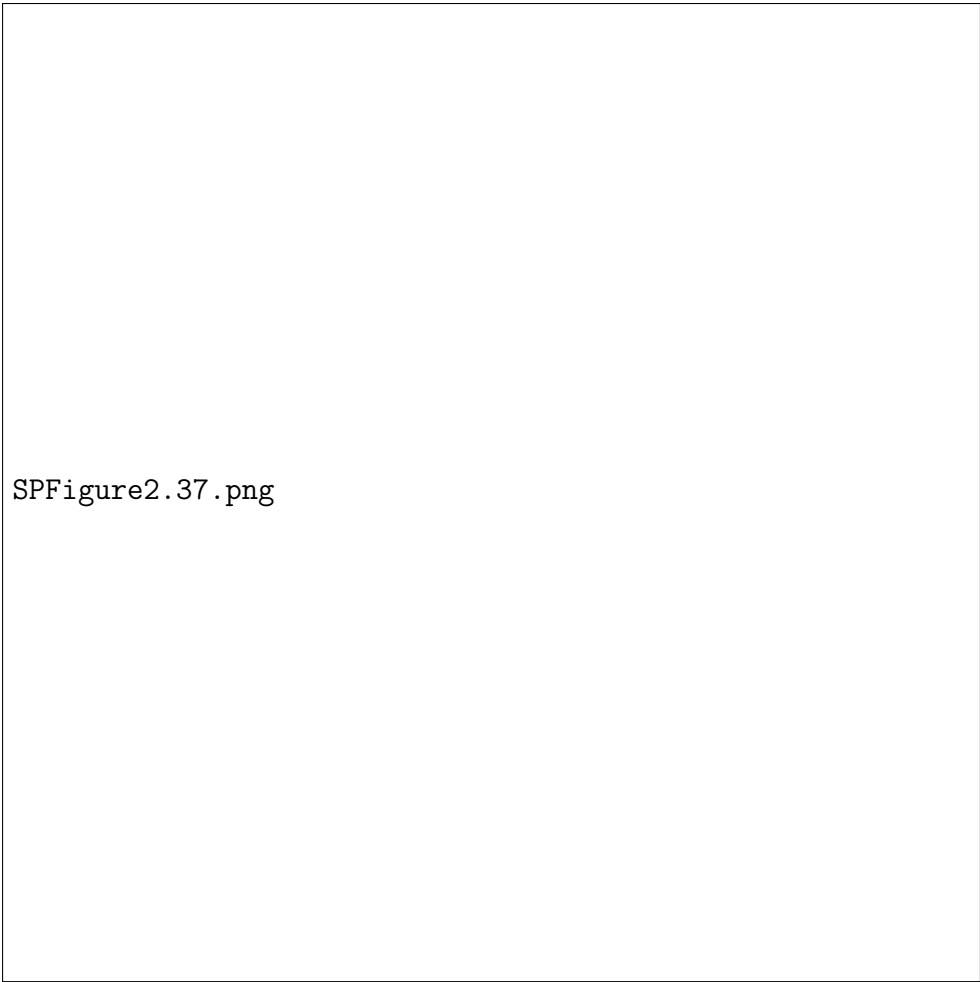
If the 3rd term and the 6th term of an arithmetic sequence are 18 and  $-6$  respectively, then 2nd term of the sequence is

- A.  $-8$ .
- B.  $10$ .
- C.  $26$ .
- D.  $34$ .

**37. HKDSE MATH Core Practice Paper II Q37**

If the figure shows the graph of  $y = f(x)$  and the graph of  $y = g(x)$  on the same rectangular coordinate system, then





SPFigure2.37.png

A.  $g(x) = f(x - 2) - 3$ .


B.  $g(x) = f(x - 2) + 3$ .

C.  $g(x) = f(x + 2) - 3$ .

D.  $g(x) = f(x + 2) + 3$ .

38. **HKDSE MATH Core Practice Paper II Q38**

In the figure,  $y =$



SPFigure2.38.png

- A.  $\frac{x \sin 77^\circ}{\sin 56^\circ}$ .
- B.  $\frac{x \sin 47^\circ}{\sin 56^\circ}$ .
- C.  $\frac{x \sin 56^\circ}{\sin 77^\circ}$ .
- D.  $\frac{x \sin 77^\circ}{\sin 47^\circ}$ .

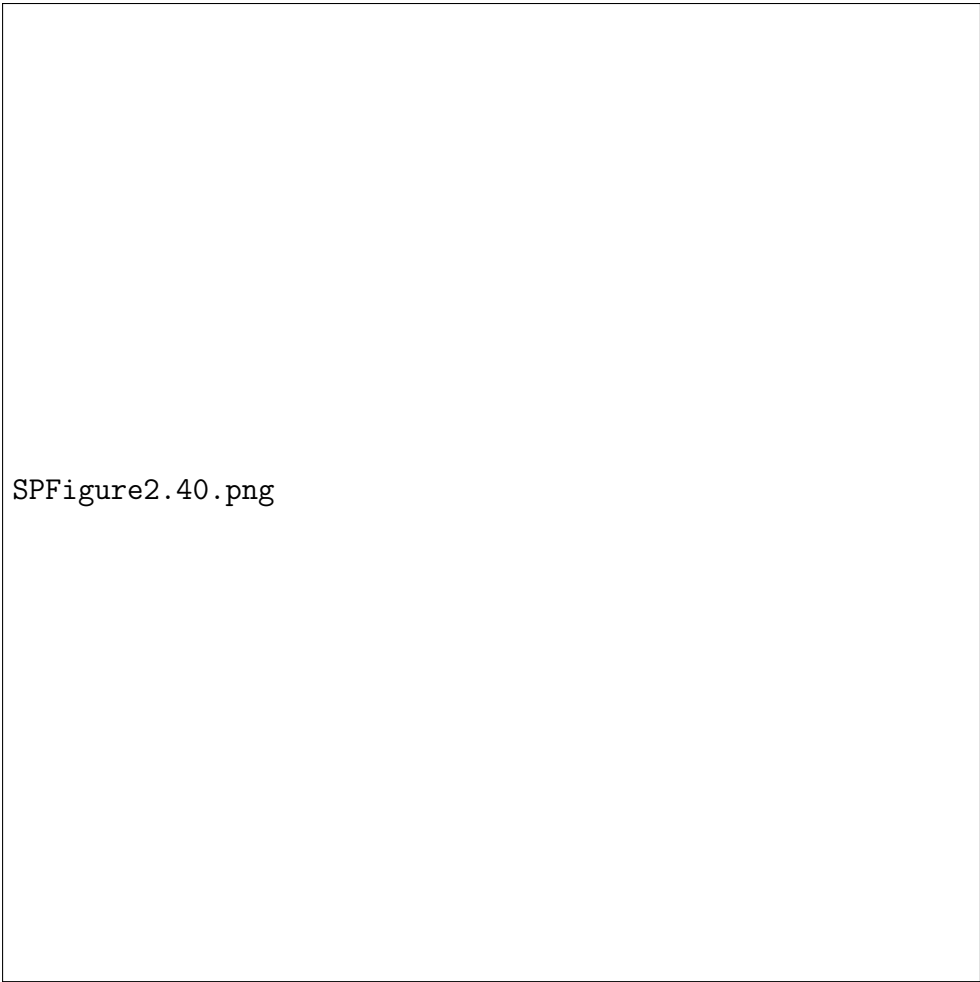
39. **HKDSE MATH Core Practice Paper II Q39**

Peter invests \$  $P$  at the beginning of each month in a year at an interest rate of 6% per annum, compounded monthly. If he gets \$10 000 at the end of the year, find  $P$  correct to the 2 decimal places.

- A. 806.63
- B. 829.19
- C. 833.33
- D. 882.18

40. **HKDSE MATH Core Practice Paper II Q40**

The figure shows a cuboid  $ABCDEFGH$ . If the angle between the triangle  $ACE$  and the plane  $ABCD$  is  $\theta$ , then  $\tan \theta =$

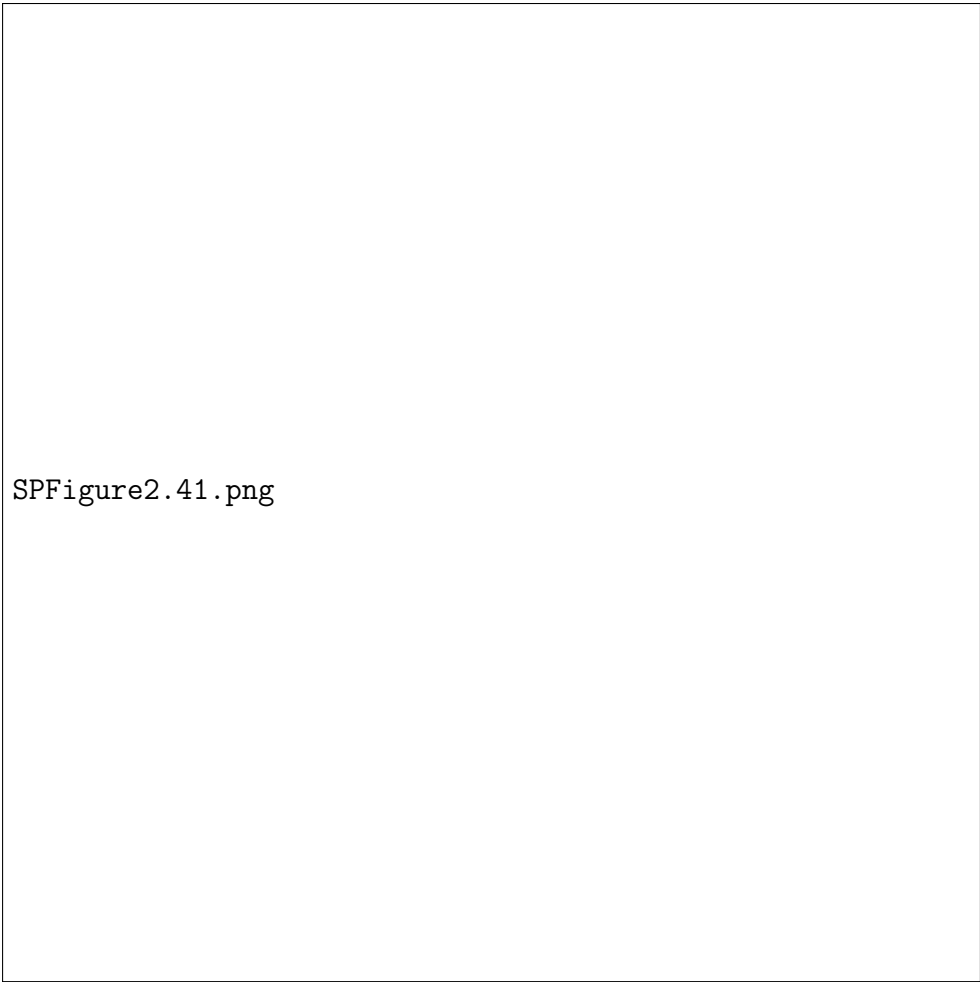


SPFigure2.40.png

- A. 2.
- B.  $\frac{3}{2}$ .
- C.  $\frac{5}{2}$ .
- D.  $\frac{12}{5}$ .

41. **HKDSE MATH Core Practice Paper II Q41**

In the figure,  $A$ ,  $B$  and  $C$  are points lying on the circle.  $TA$  is the tangent to the circle at  $A$ . The straight line  $CBT$  is perpendicular to  $TA$ . If  $BC = 6$  cm, find the radius of the circle correct to the nearest 0.1 cm.

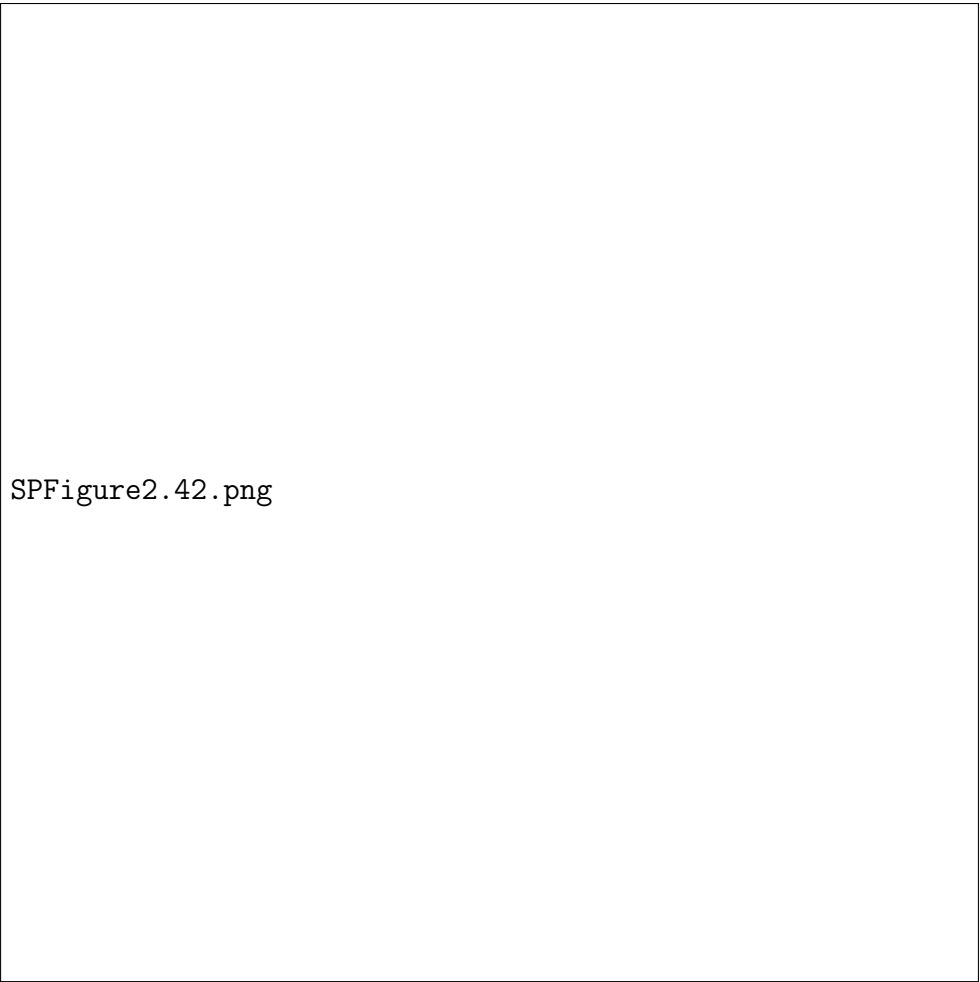


SPFigure2.41.png

- A. 3.2 cm
- B. 3.9 cm
- C. 4.2 cm
- D. 4.7 cm

42. **HKDSE MATH Core Practice Paper II Q42**

Let  $a$  be a constant and  $-90^\circ < b < 90^\circ$ . If the figure shows the graph of  $y = a \cos(x^\circ + b)$ , then



SPFigure2.42.png

- A.  $a = -3$  and  $b = -40^\circ$ .
- B.  $a = -3$  and  $b = 40^\circ$ .
- C.  $a = 3$  and  $b = -40^\circ$ .
- D.  $a = 3$  and  $b = 40^\circ$ .

**43. HKDSE MATH Core Practice Paper II Q43**

Bag  $A$  contains 2 red balls, 3 green balls and 4 white balls while bag  $B$  contains 2 red balls, 3 green balls and 4 yellow balls. If one ball is drawn randomly from each bag, then the probability that the two balls drawn are of different colours is

- A.  $\frac{13}{81}$ .
- B.  $\frac{29}{81}$ .
- C.  $\frac{52}{81}$ .
- D.  $\frac{68}{81}$ .

**44. HKDSE MATH Core Practice Paper II Q44**

If 2 girls and 5 boys randomly form a queue, find the probability that the two girls are next to each other in the queue.

- A.  $\frac{1}{7}$
- B.  $\frac{2}{7}$
- C.  $\frac{6}{7}$
- D.  $\frac{1}{21}$

45. **HKDSE MATH Core Practice Paper II Q45**

A set of numbers has a mode of 32, an inter-quartile range of 27 and a variance of 25. If 3 is added to each number of the set and each resulting number is then doubled to form a new set of numbers, find the mode, the inter-quartile range and the variance of the new set of numbers.

	Mode	Inter-quartile range	Variance
A.	64	60	50
B.	70	60	100
C.	70	54	50
D.	70	54	100