# 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 $p$ and $q$ be constants. If $x^2 + p(x + 5) + q \equiv (x - 2)(x + 5)$, then $q =$

   A. $-25$.

   B. $-10$.

   C. 3.

   D. 5.

5. **HKDSE MATH Core Practice Paper II Q5**
   Let $f(x) = x^3 + 2x^2 - 7x + 3$. When $f(x)$ is divided by $x + 2$, the remainder is

   A. 3.

   B. 5.

   C. 17.

D. 33.

6. **HKDSE MATH Core Practice Paper II Q6**
Let $a$ be a constant. Solve tne equation $(x-a)(x-a-1)=(x-a)$.

A. $x=a+1$

B. $x=a+2$

C. $x=a$ or $x=a+1$

D. $x=a$ or $x=a+2$

7. **HKDSE MATH Core Practice Paper II Q7**
Find the range of values of $k$ such that the quadratic equation $x^2-6x=2-k$ has no real roots.

A. $k<-7$

B. $k>-7$

C. $k<11$

D. $k>11$

8. **HKDSE MATH Core Practice Paper II Q8**
In the figure, the quadratic graph of $y=f(x)$ intersects the straight line $L$ at $A(1,k)$ and $B(7,k)$. 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


9. **HKDSE MATH Core Practice Paper II Q9**
The solution of $5-2x<3$ and $4x+8>0$ is

A. $x>-2$.

B. $x>-1$.

C. $x>1$.

D. $-2<x<1$.

10. **HKDSE MATH Core Practice Paper II Q10**
Mary sold two bags for \$240 each. She gained 20% on one and lost 20% on the other. After the two transactions, Mary

A. lost \$20.

B. gained \$10.

C. gained \$60.

D. had no gain and no loss.

11. **HKDSE MATH Core Practice Paper II Q11**
Let $a_n$ be the $n$th term of a sequence. If $a_1 = 4$, $a_2 = 5$ and $a_{n+2} = a_n + a_{n+1}$ for any positive integer $n$, then $a_{10} =$

A. 13.

B. 157.

C. 254.

D. 411.

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

13. **HKDSE MATH Core Practice Paper II Q13**
If $x$, $y$ and $z$ are non-zero numbers such that $2x = 3y$ and $x = 2z$, then $(x + z) : (x + y) =$

A. 3 : 5.

B. 6 : 7.

C. 9 : 7.

D. 9 : 10.

14. **HKDSE MATH Core Practice Paper II Q14**
It is given that $z$ varies directly as $x$ and inversely as $y$. When $x = 3$ and $y = 4$ , $z = 18$ . When $x = 2$ and $z = 8$, $y =$

A. 1.

B. 3.

C. 6.

D. 9.

15. **HKDSE MATH Core Practice Paper II Q15**
The lengths of the three sides of a triangle are measured as 15 cm, 24 cm and 25 cm respectively. If the three measurements are correct to the nearest cm , find the percentage error in calculating the perimeter of the triangle correct to the nearest 0.1%.

A. 0.8%

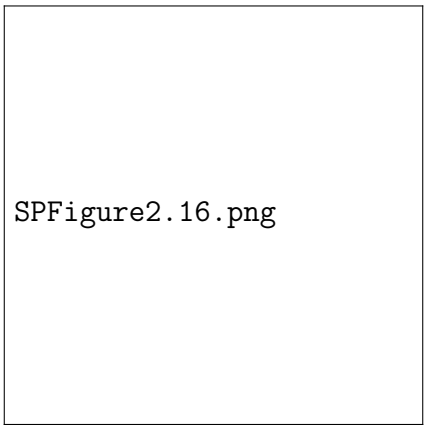
B. 2.3%

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 $\text{cm}^2$

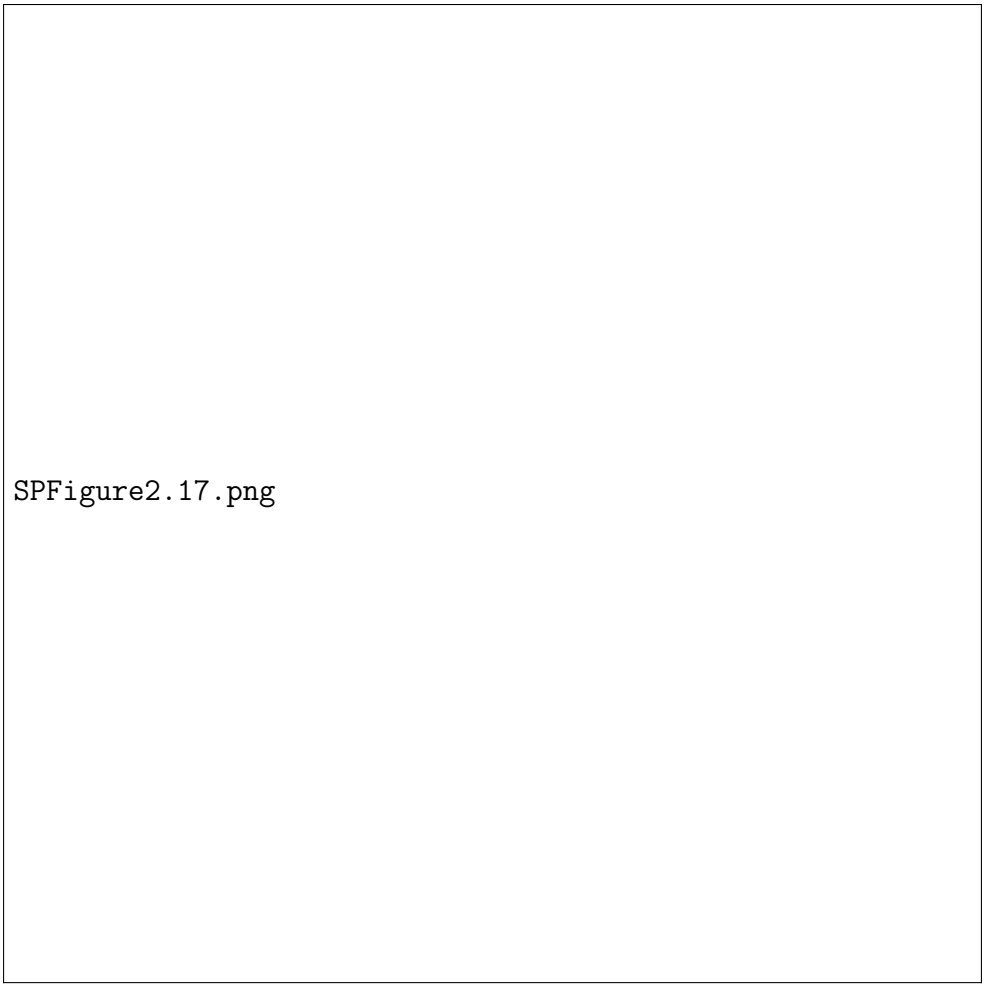
B. 230 $\text{cm}^2$

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?

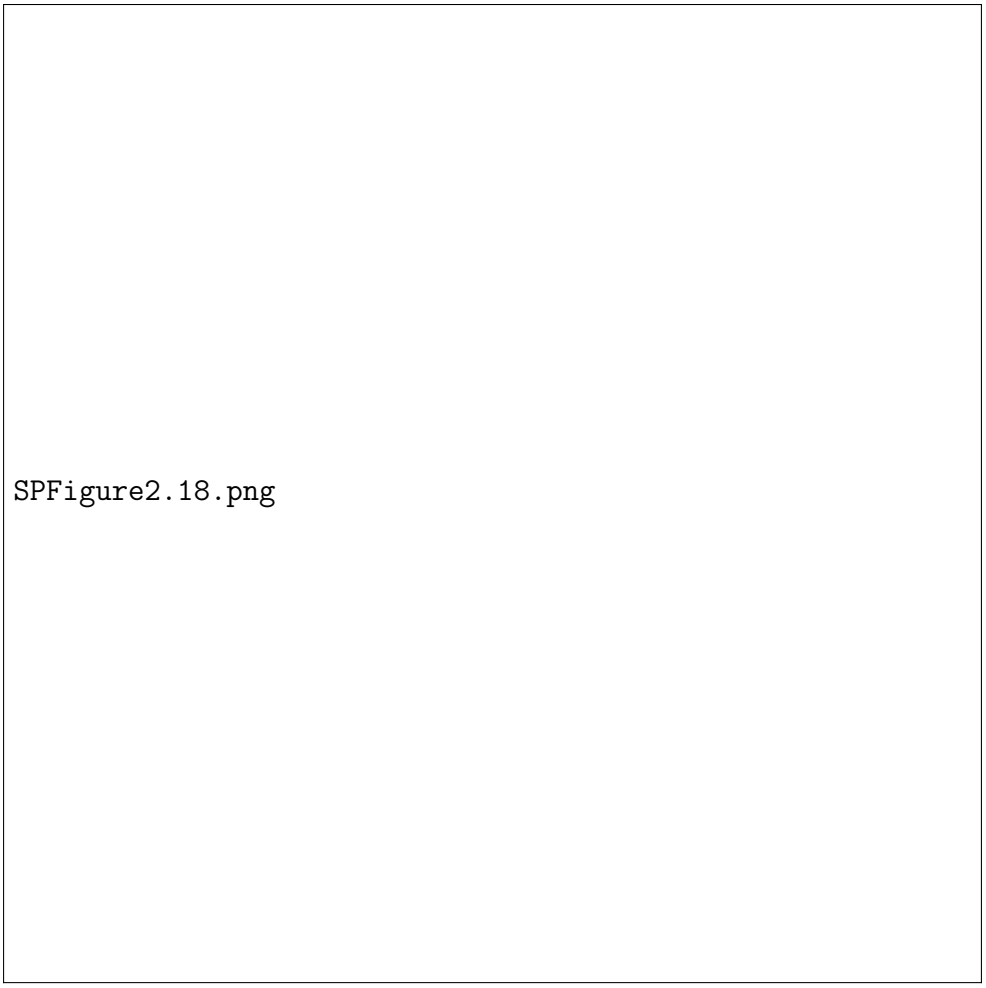
A. $a < b < c$

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 $Cd = 9$ 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. $\sin\theta$.

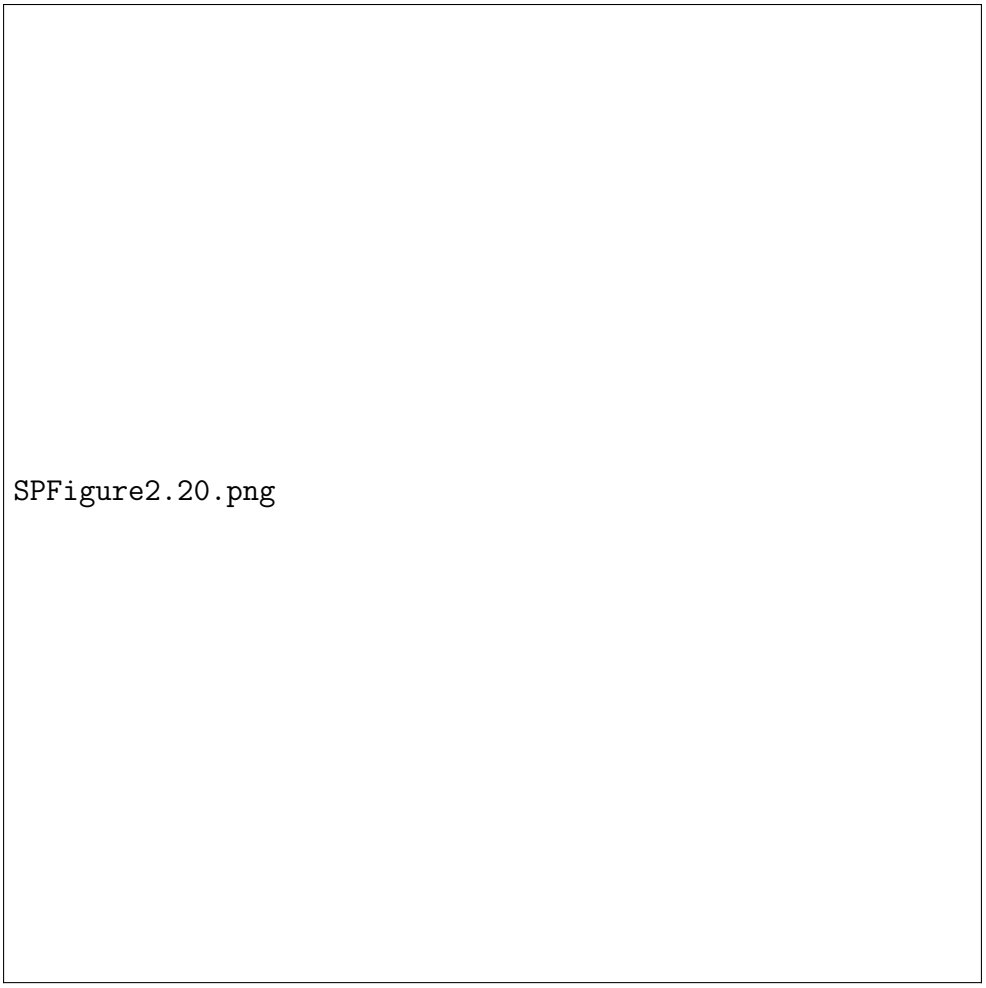
B. $3\sin\theta$.

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.




A. 7.2 cm

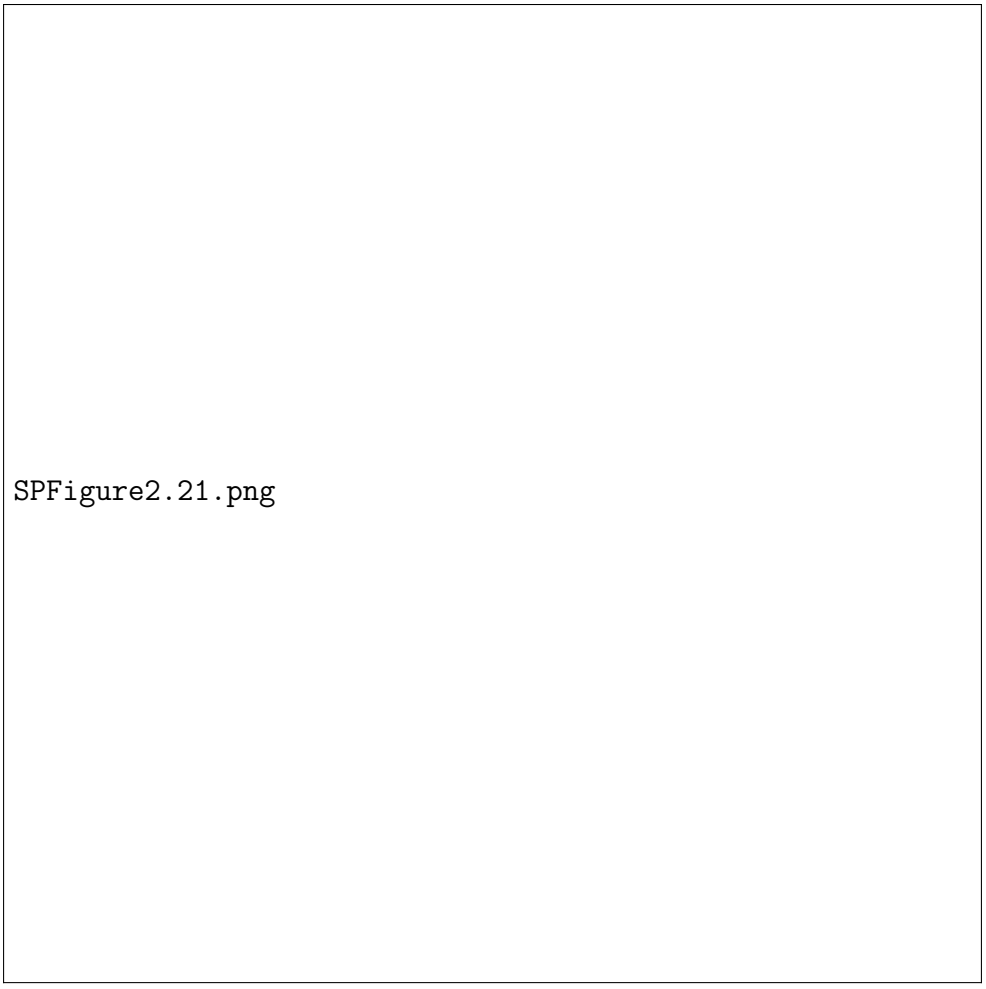
B. 7.4 cm

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 $\angle ADC =$



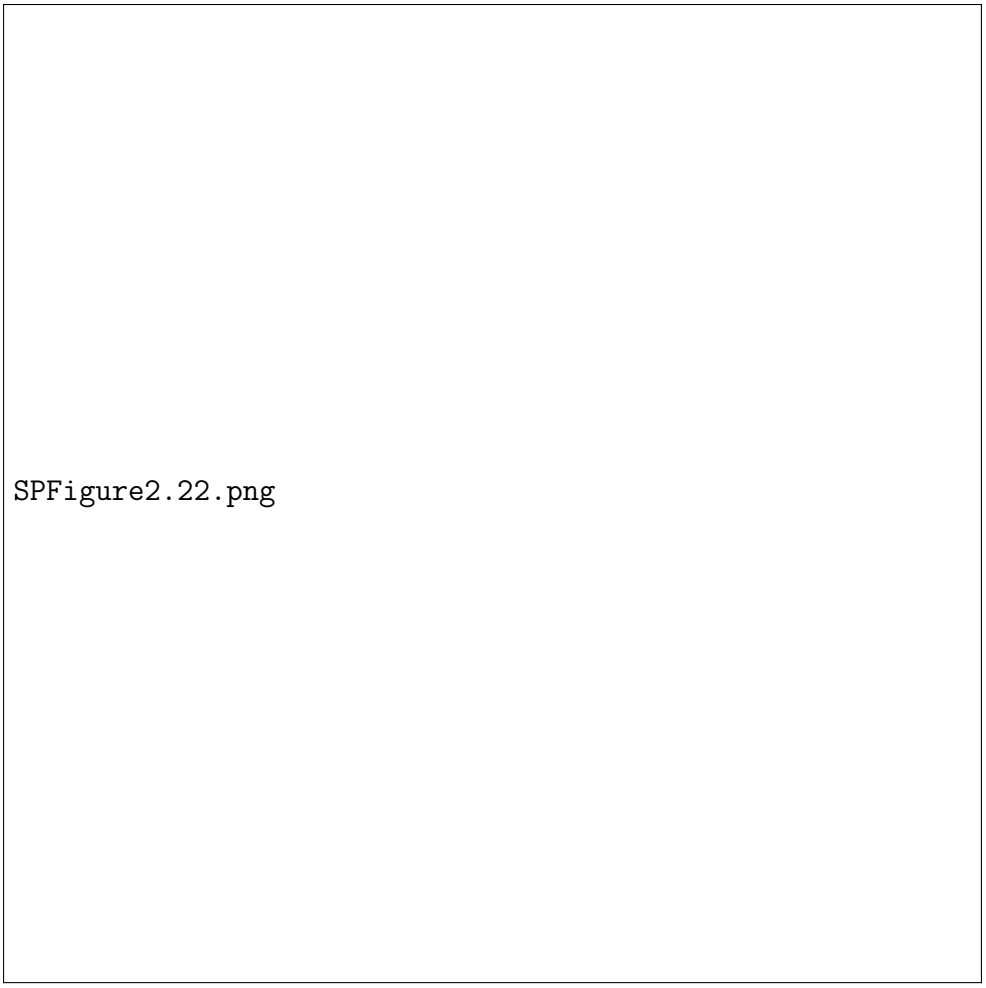

A. 118°.

B. 121°.

C. 124°.

D. 126°.

22. **HKDSE MATH Core Practice Paper II Q22**
In the figure, $O$ is the centre of the circle $ABCDE$. If $\angle ABE = 30°$ and $\angle CDE = 105°$, then $\angle AOC =$




A. 120°.

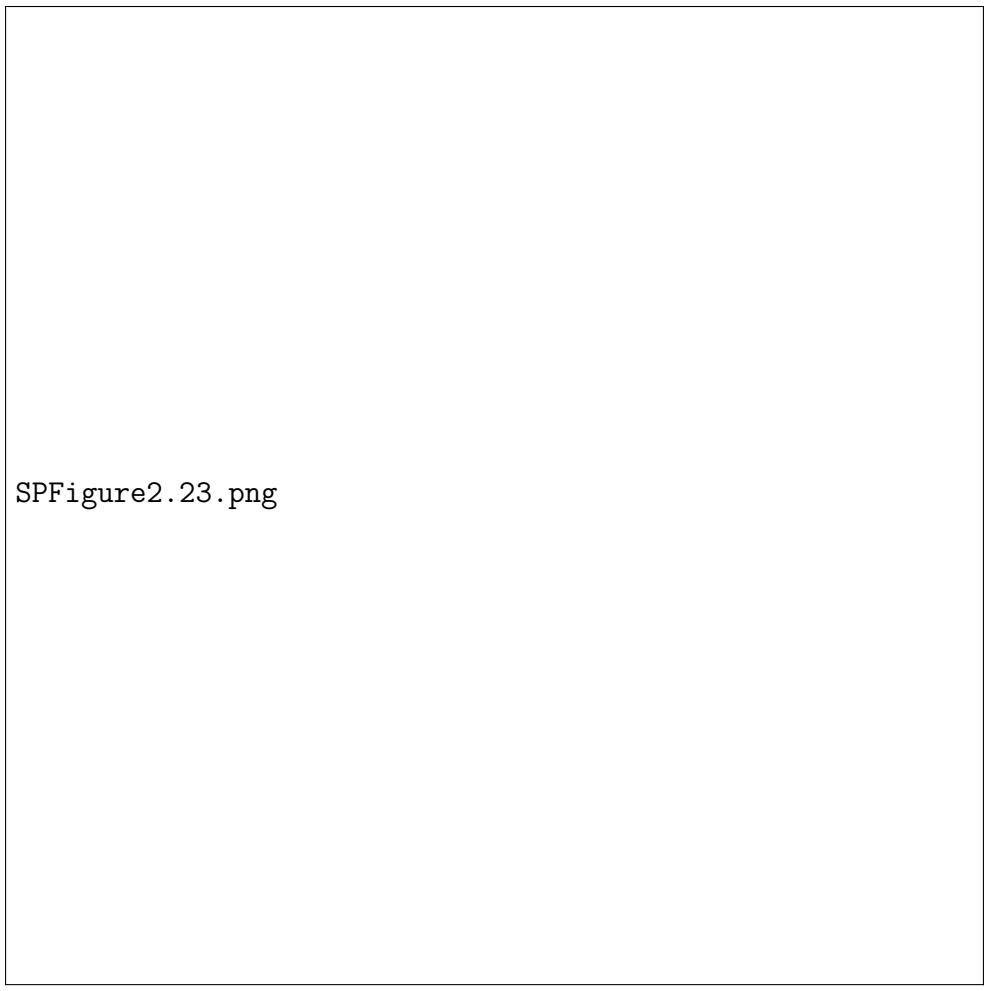
B. 135°.

C. 150°.

D. 165°.

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 $AF : BC =$



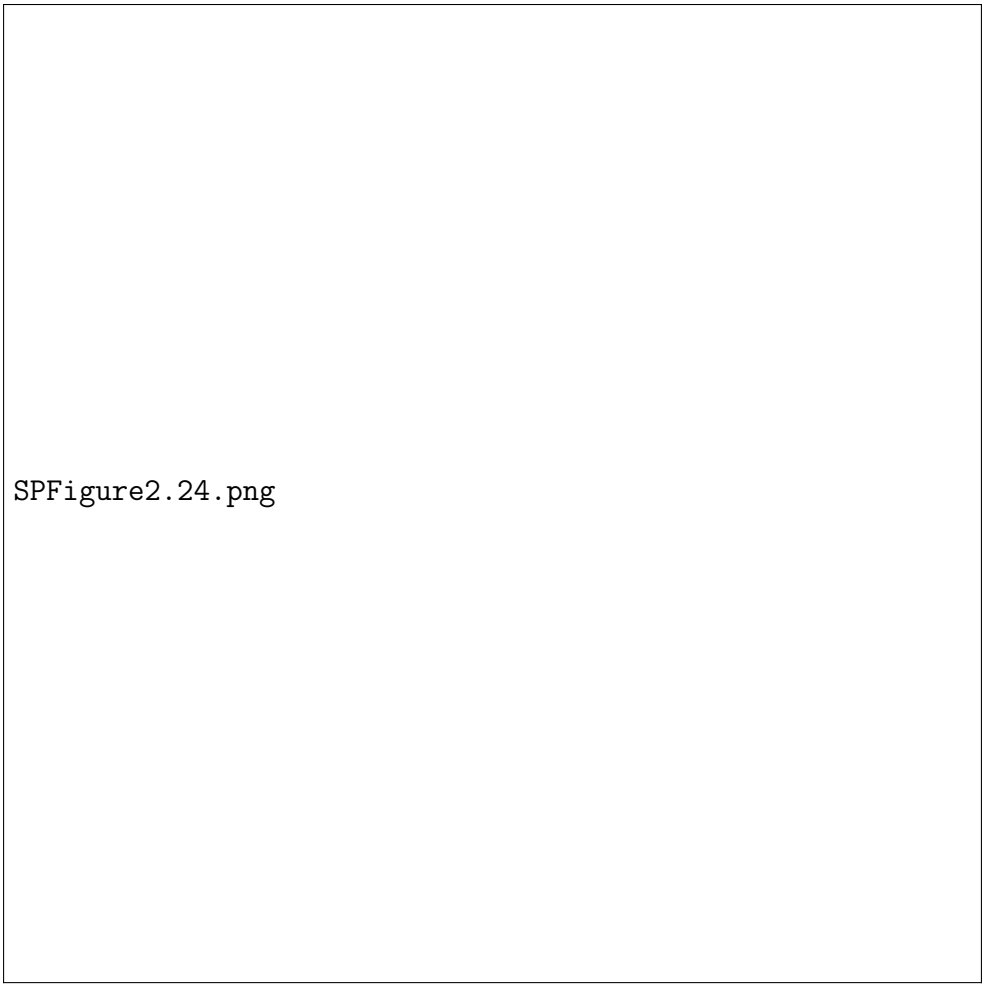

A. $1 : 2$.

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 $BC$ corrent to the nearest cm.




A. 8 cm

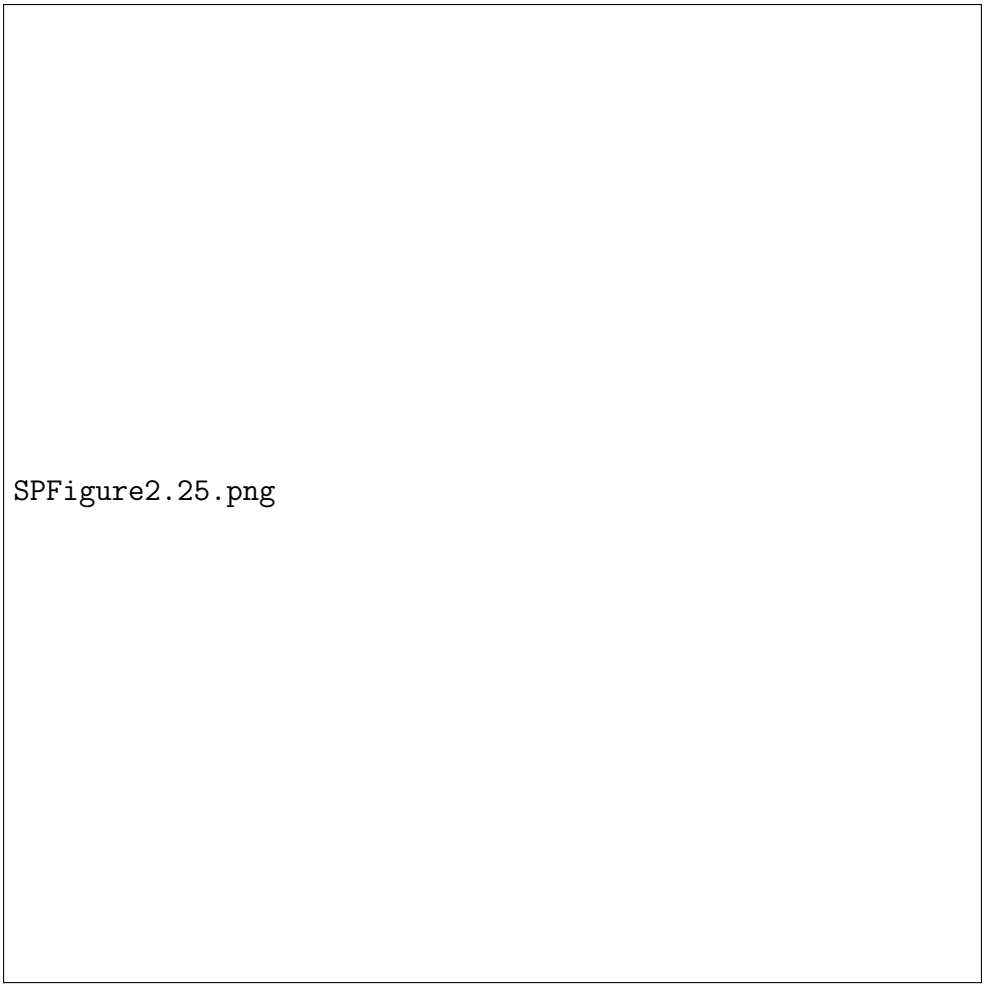
B. 13 cm

C. 14 cm

D. 15 cm

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

In the figure, the two 6-sided polygons show




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 $180°$, then the coordinates of its image are

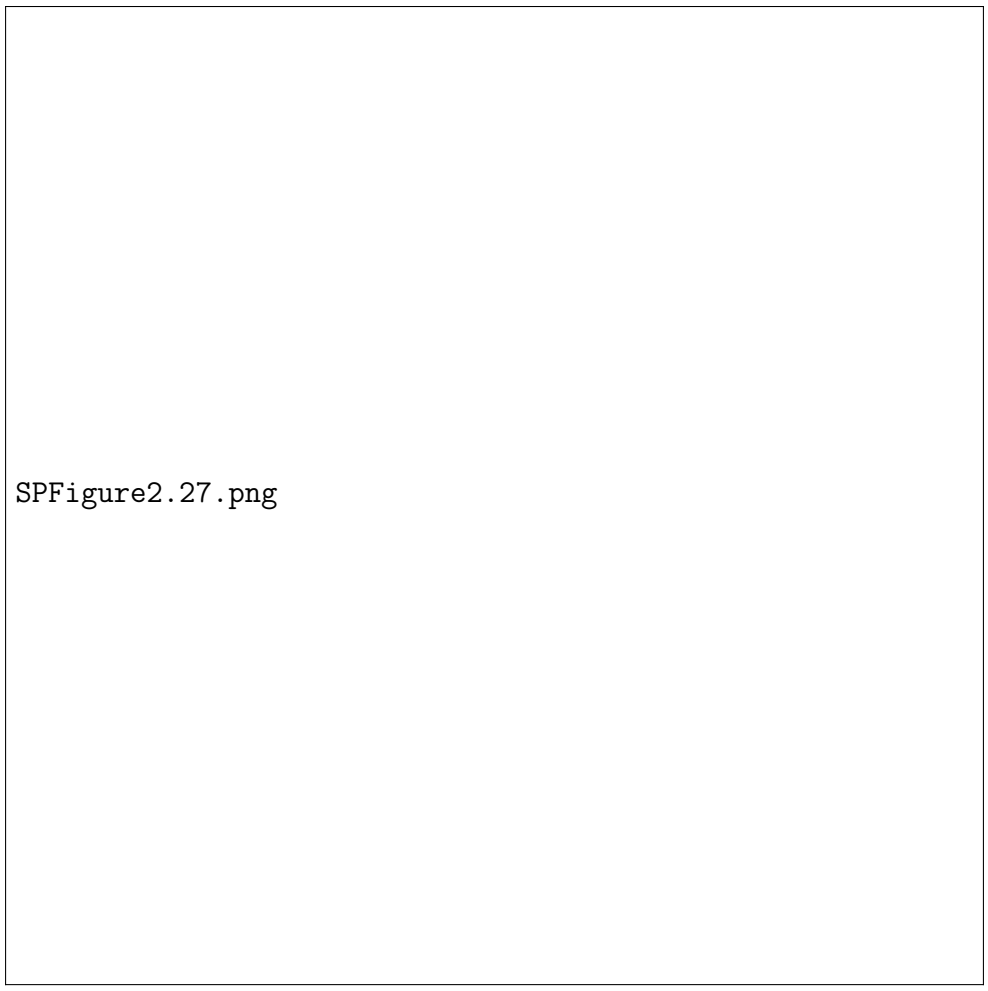
A. $(-3, -4)$.

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.




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

A. $\dfrac{-2}{(2-x)^2}$.

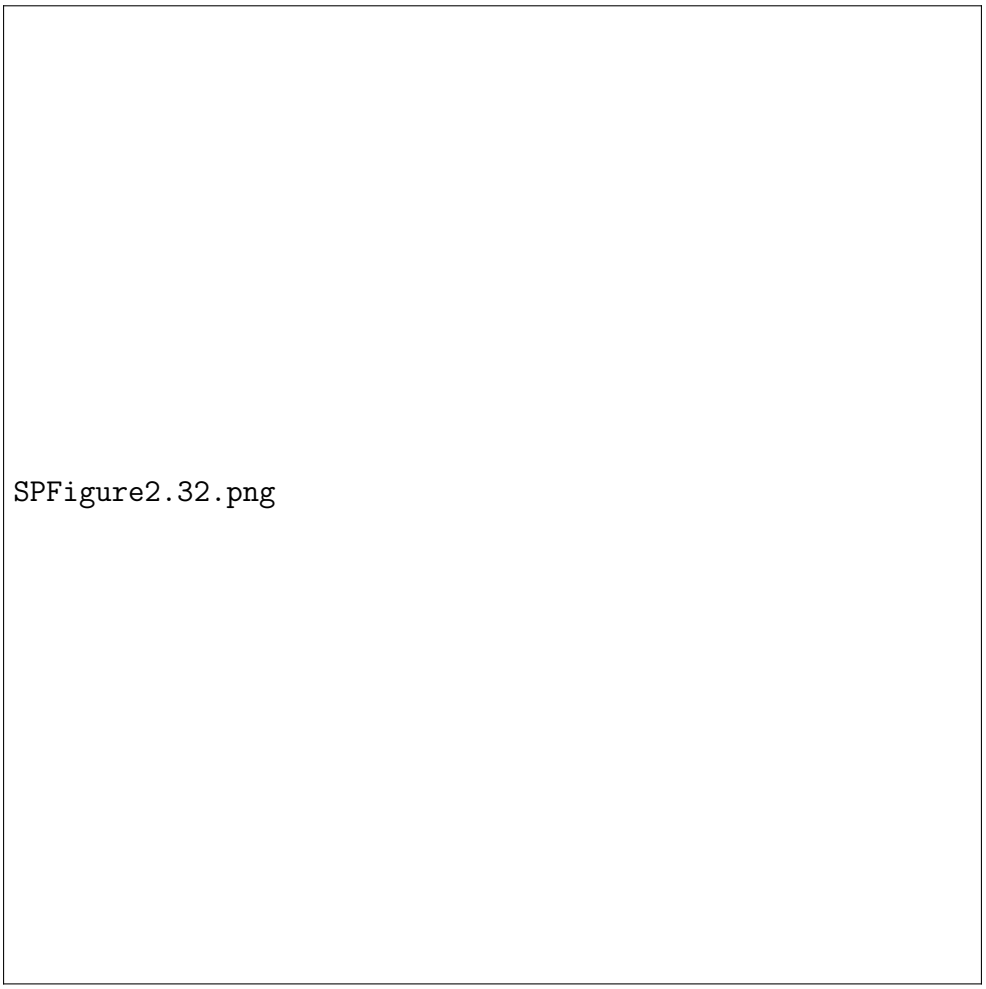
B. $\dfrac{1}{(2-x)^2}$.

C. $\dfrac{-2x+3}{(2-x)^2}$.

D. $\dfrac{2x-3}{(2-x)^2}$.

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**

$10100100001001_2 =$

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 $4k - \dfrac{6 + ki}{i} =$

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. $-8$.

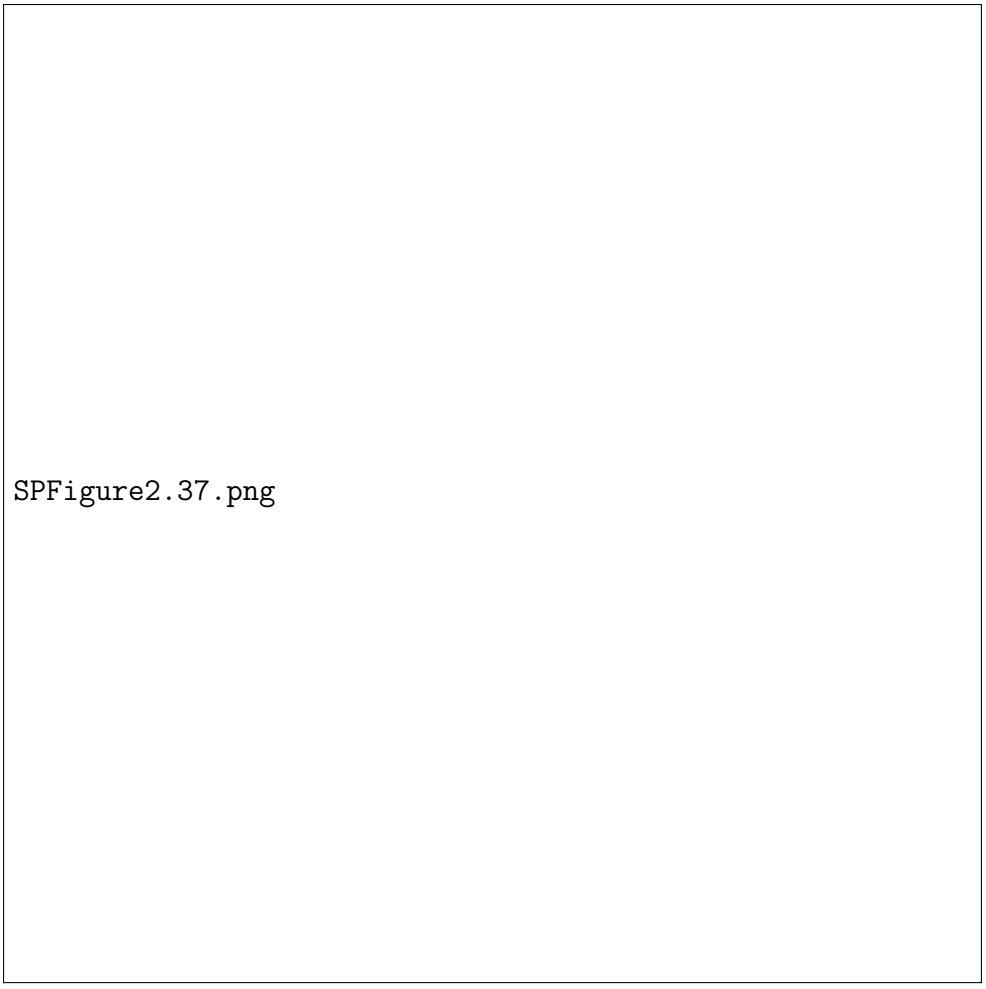
B. 10.

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




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

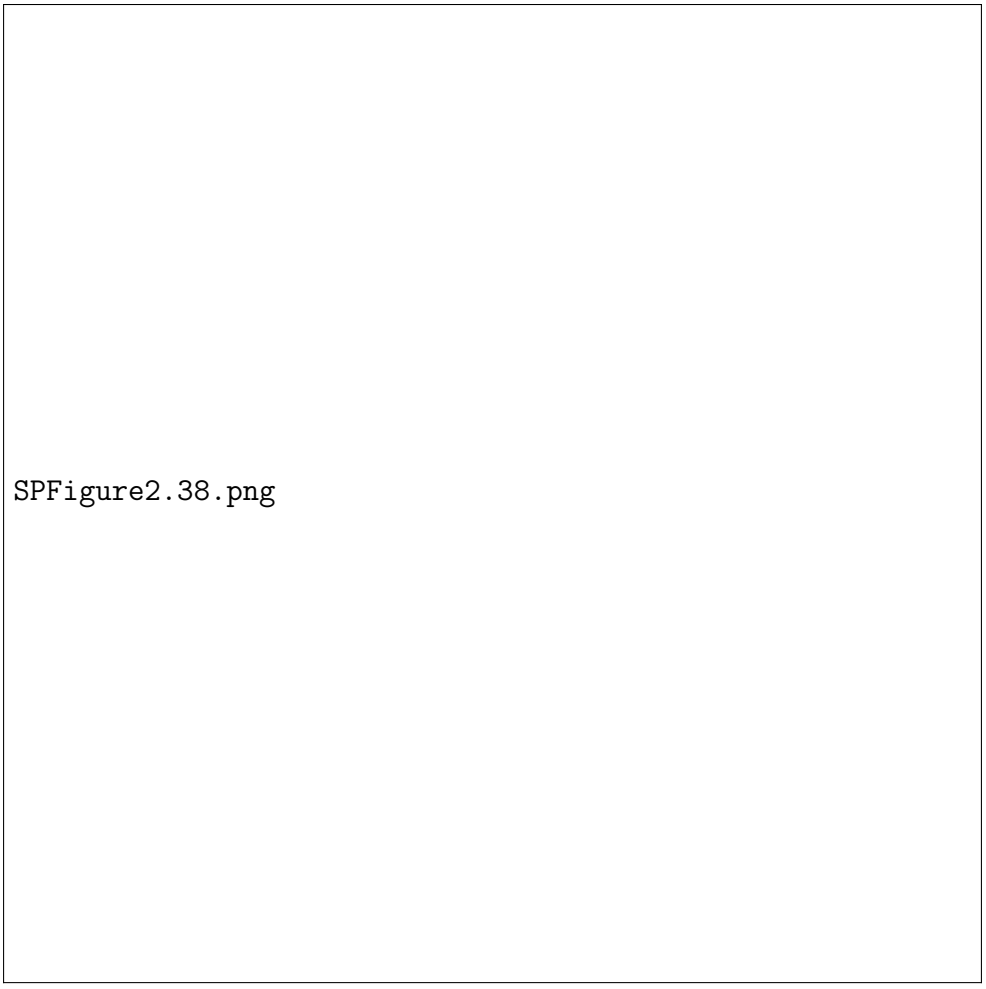
B. $g(x) = f(x-2) + 3$.

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, $y =$




A. $\dfrac{x \sin 77^\circ}{\sin 56^\circ}$.

B. $\dfrac{x \sin 47^\circ}{\sin 56^\circ}$.

C. $\dfrac{x \sin 56^\circ}{\sin 77^\circ}$.

D. $\dfrac{x \sin 77^\circ}{\sin 47^\circ}$.

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

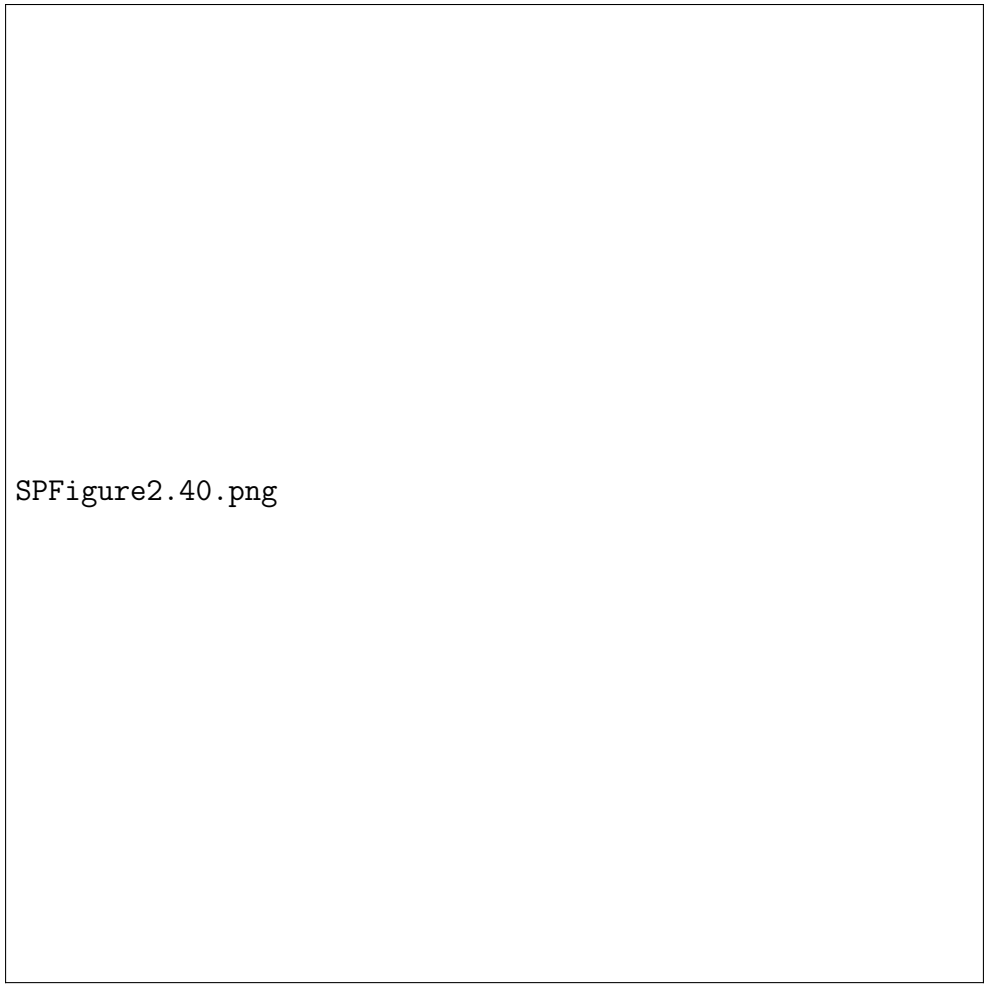
B. 829.19

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 $\tan\theta =$




A. 2.

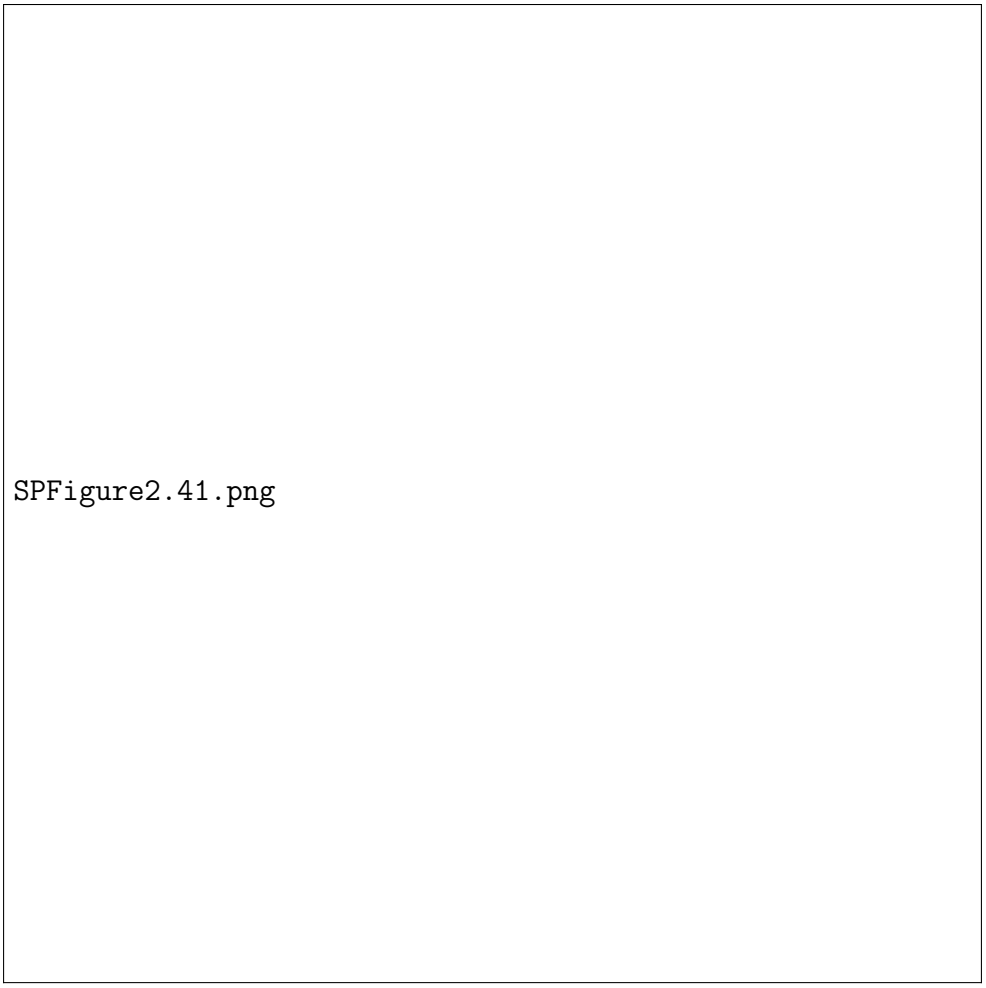
B. $\frac{3}{2}$.

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.




A. 3.2 cm

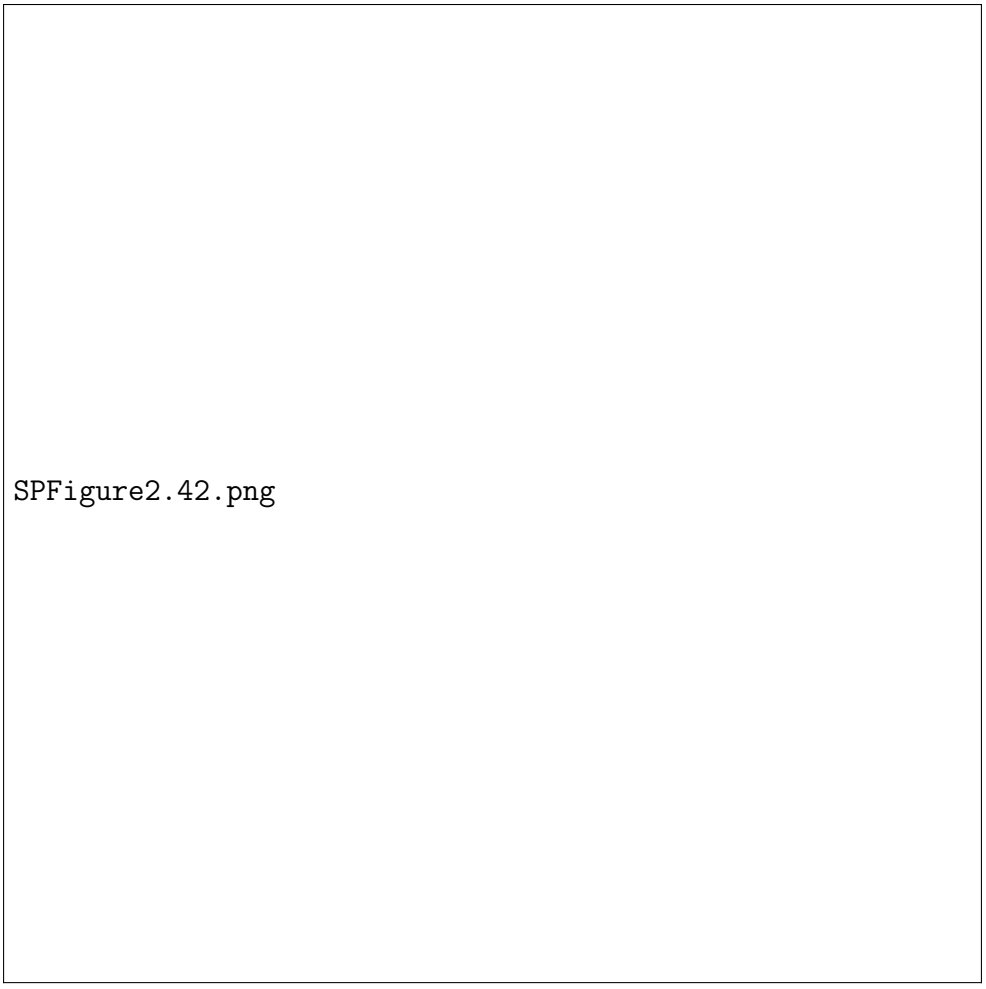
B. 3.9 cm

C. 4.2 cm

D. 4.7 cm

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

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




A. $a = -3$ and $b = -40°$.

B. $a = -3$ and $b = 40°$.

C. $a = 3$ and $b = -40°$.

D. $a = 3$ and $b = 40°$.

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 |