



**MATHEMATICS**

---

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of 16 pages. Please check that your paper is complete.
  2. Read the questions carefully.
  3. Write your examination number in the allocated space on your Answer Sheet.
  4. This is a **multiple choice** assessment. Indicate your selection for each question clearly on the Answer Sheet provided. **Do not** make more than one selection per question.
  5. Answer all the questions.
  6. It is in your own interest to write legibly and to present your work neatly.
-

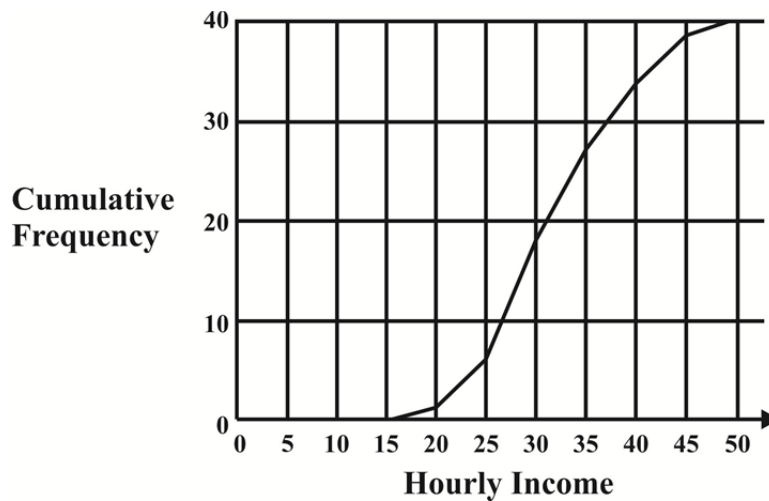
**QUESTION 1**

Which formula would enable me to determine how much money I initially invested if after 4 years at an interest rate of 12% p.a. compounded monthly it is worth R9 000?

- (A)  $\frac{9000}{(1+0,12)^4}$                       (B)  $\frac{9000}{(1+0,12)^{48}}$
- (C)  $\frac{9000}{(1+0,01)^{48}}$                       (D)  $\frac{9000}{(1+0,01)^4}$

**QUESTION 2**

Consider the cumulative frequency curve shown below. It depicts the hourly income (in Rands) of a group of students.



Which of the amounts below is the best approximation of the inter-quartile range?

- (A) R27                      (B) R10                      (C) R37                      (D) R32

**QUESTION 3**

Simplify:  $\frac{3^{2x} - 2 \cdot 9^x}{18^x}$

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

**QUESTION 4**

The solution to the inequality  $-2x^2 + x \geq -6$  is:

- (A)  $-1,5 \leq x \leq 2$
- (B)  $-2 \leq x \leq 1,5$
- (C)  $x \leq -1,5$  or  $x \geq 2$
- (D)  $x \leq -2$  or  $x \geq 1,5$

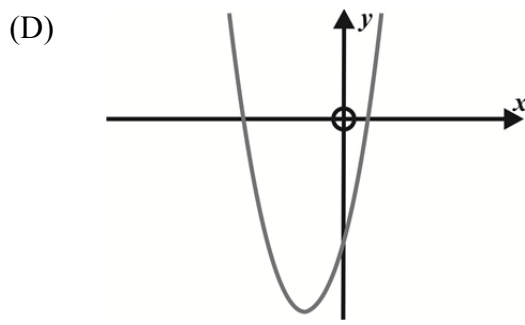
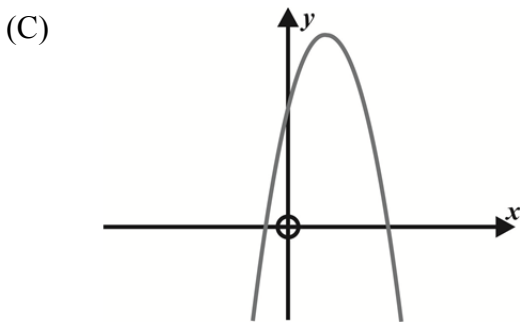
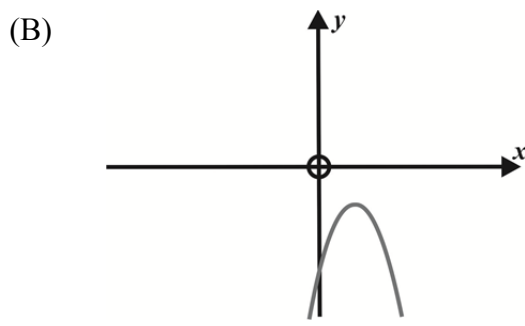
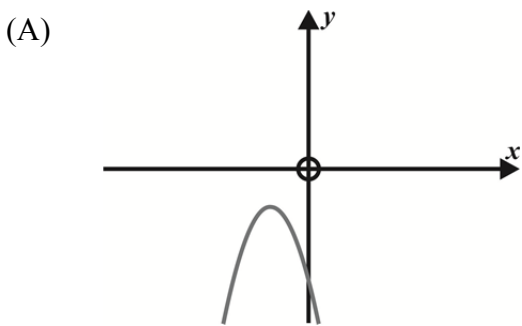
**QUESTION 5**

Tebogo earns 15% more than Peter does. If Tebogo earns  $x$ , then Peter earns:

- (A)  $x-15$
- (B)  $0,85x$
- (C)  $\frac{x}{1,15}$
- (D)  $x-0,15$

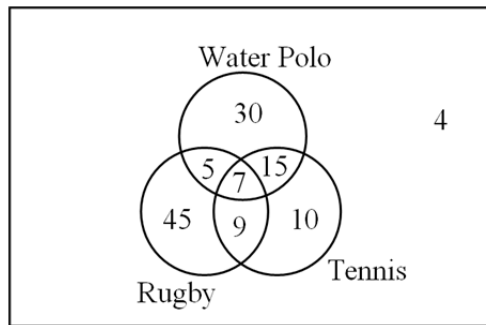
**QUESTION 6**

The parabola  $y = -2x^2 - 4x - 3$  is shown. Which is the most feasible graph?



**QUESTION 7**

Consider the following Venn diagram depicting the number of boys playing Water Polo, Rugby and Tennis in a certain school. Also depicted are the boys that play no sport.



What is the probability that a boy chosen at random plays Tennis and Water Polo but not Rugby?

- (A)  $\frac{1}{3}$                       (B)  $\frac{55}{120}$                       (C)  $\frac{62}{120}$                       (D)  $\frac{3}{25}$

**QUESTION 8**

Nelson, Noma, Mpumi and Dhaya shared a bag of marbles in the ratio 3:1:5:7 respectively. Mpumi and Dhaya together got 48 marbles. How many marbles did Nelson get?

- (A) 3                      (B) 4                      (C) 9                      (D) 12

**QUESTION 9**

Simplify:  $\frac{\sin 23^\circ \cdot \cos 67^\circ - 1}{\tan 247^\circ}$

- (A)  $\sin^2 23^\circ \cos 67^\circ$                       (B)  $-\frac{1}{2} \sin 134^\circ$   
 (C)  $+\sin 67^\circ \cos 67^\circ$                       (D)  $\sin^2 67^\circ$

**QUESTION 10**

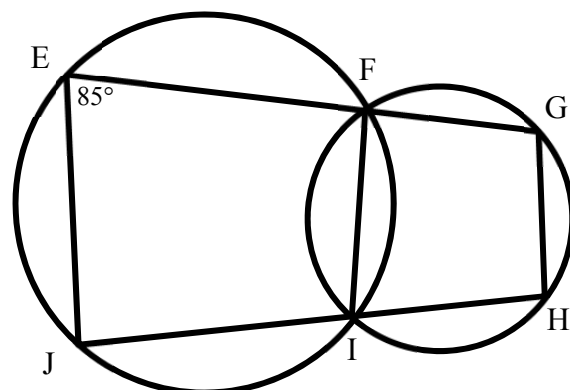
EFIJ and FGHI are cyclic quadrilaterals.

EFG and JIH are straight lines.

$\hat{E} = 85^\circ$

$\hat{G} =$

- (A)  $90^\circ$                       (B)  $170^\circ$   
 (C)  $85^\circ$                       (D)  $95^\circ$



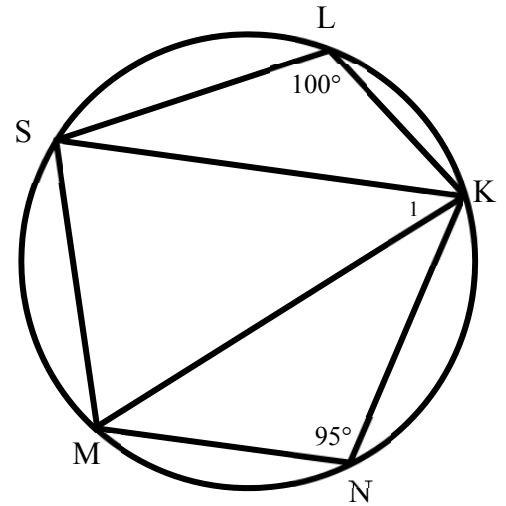
**QUESTION 11**

S, L, K, N and M are points on the circumference of a circle.

$\hat{L} = 100^\circ$  and  $\hat{N} = 95^\circ$

Find the size of  $\hat{K}_1$ .

- (A)  $10^\circ$                       (B)  $15^\circ$
- (C)  $80^\circ$                       (D)  $85^\circ$



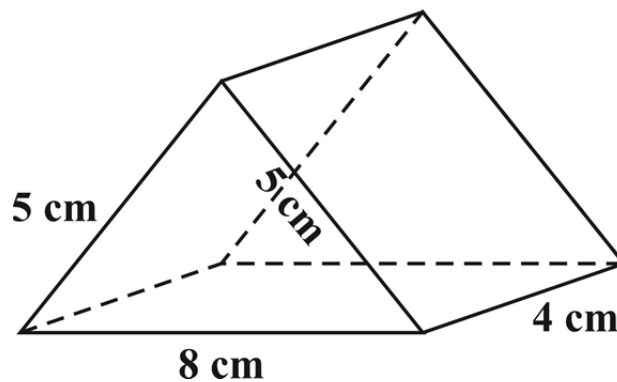
**QUESTION 12**

If  $\sqrt[3]{3}$ ,  $\sqrt[4]{5}$  and  $\sqrt[3]{4}$  are arranged from smallest to biggest, we have:

- (A)  $\sqrt[4]{5} < \sqrt{3} < \sqrt[3]{4}$                       (B)  $\sqrt[3]{4} < \sqrt{3} < \sqrt[4]{5}$
- (C)  $\sqrt{3} < \sqrt[3]{4} < \sqrt[4]{5}$                       (D)  $\sqrt[4]{5} < \sqrt[3]{4} < \sqrt{3}$

**QUESTION 13**

Consider the triangular prism below:



Calculate the total surface area.

- (A)  $76 \text{ cm}^2$                       (B)  $44 \text{ cm}^2$                       (C)  $64 \text{ cm}^2$                       (D)  $96 \text{ cm}^2$

**QUESTION 14**

The fourth and fifth terms of a **quadratic** sequence are 22 and 39 respectively. The **second** difference is 4. What is the second term of the sequence?

- (A)  $-12$                       (B)  $9$                       (C)  $0$                       (D)  $13$

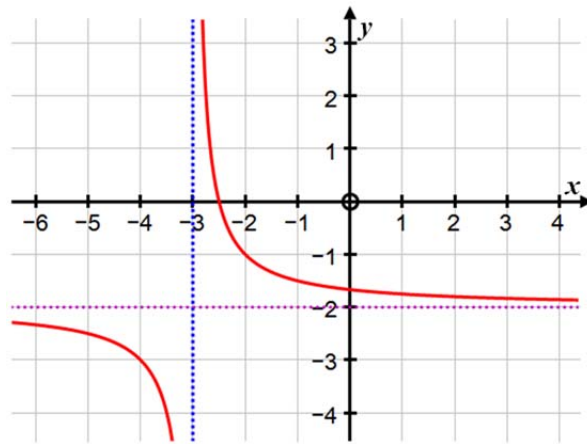
**QUESTION 15**

A cup of coffee is at a temperature of 93 °C. Thereafter it cools according to an exponential formula of the form  $T = a \times b^x + c$  where  $x$  is the time in hours and  $T$  the temperature in °C. After one hour the temperature is 58 °C. One can assume that the room temperature is a constant 23 °C. The constants  $a$ ,  $b$  and  $c$  are:

- |     |           |     |           |     |           |     |           |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| (A) | $a = 23$  | (B) | $a = 100$ | (C) | $a = 70$  | (D) | $a = 70$  |
|     | $b = 0,2$ |     | $b = 0,1$ |     | $b = 0,5$ |     | $b = 0,2$ |
|     | $c = 70$  |     | $c = 83$  |     | $c = 23$  |     | $c = 23$  |

**QUESTION 16**

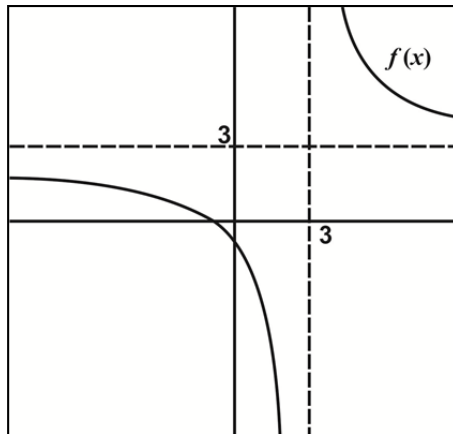
The graph of  $y = \frac{k}{x+p} + q$  is shown:



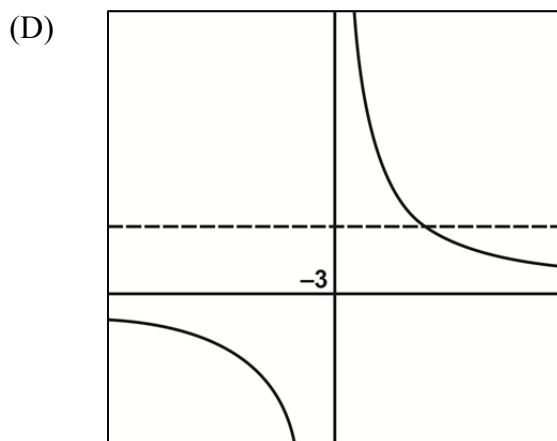
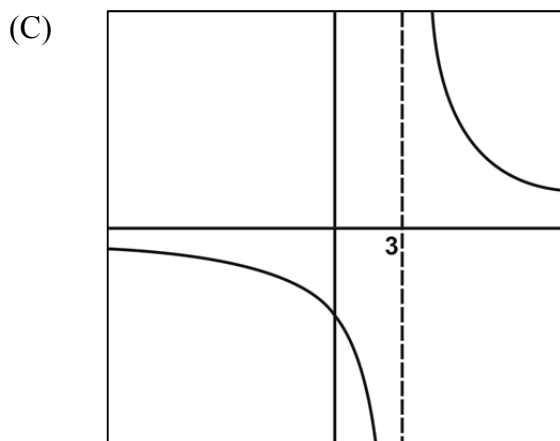
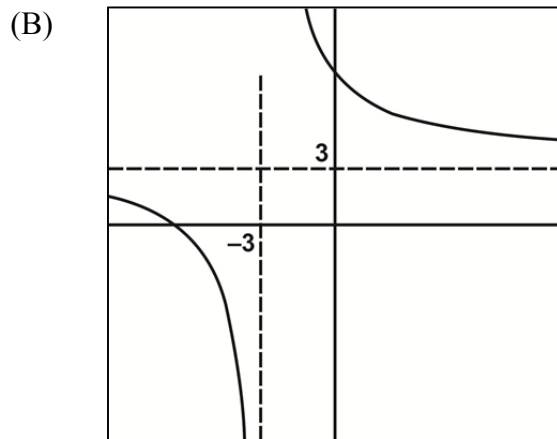
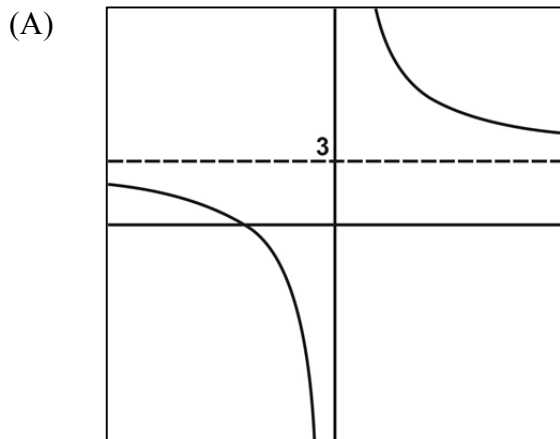
- |     |                         |     |                        |
|-----|-------------------------|-----|------------------------|
| (A) | $k < 0, p = -3, q = -2$ | (B) | $k > 0, p = 3, q = -2$ |
| (C) | $k > 0, p = -3, q = -2$ | (D) | $k < 0, p = 3, q = +2$ |

**QUESTION 17**

The graph of  $f(x)$  has been given.



Which of the following would best represent the graph of  $g(x)$  if  $g(x) = f(x+3)$ ?

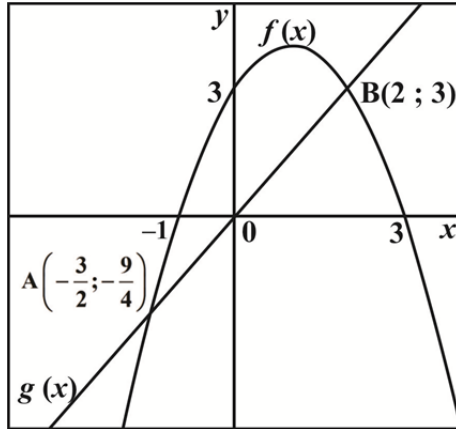


**QUESTION 18**

The figure shows the graphs of  $f(x)$  and  $g(x)$  intersecting at  $A\left(-\frac{3}{2}; -\frac{9}{4}\right)$  and  $B(2; 3)$ .

$f(x)$  cuts the  $x$ -axis at  $(-1; 0)$  and  $(3; 0)$  and the  $y$ -axis at  $(0; 3)$ .

$g(x)$  cuts the  $x$ -axis at  $(0; 0)$ .



For which value(s) of  $x$  is  $f(x) \cdot g(x) \leq 0$ ?

(A)  $x \leq -\frac{3}{2}$  or  $x \geq 2$

(B)  $-\frac{3}{2} \leq x \leq 2$

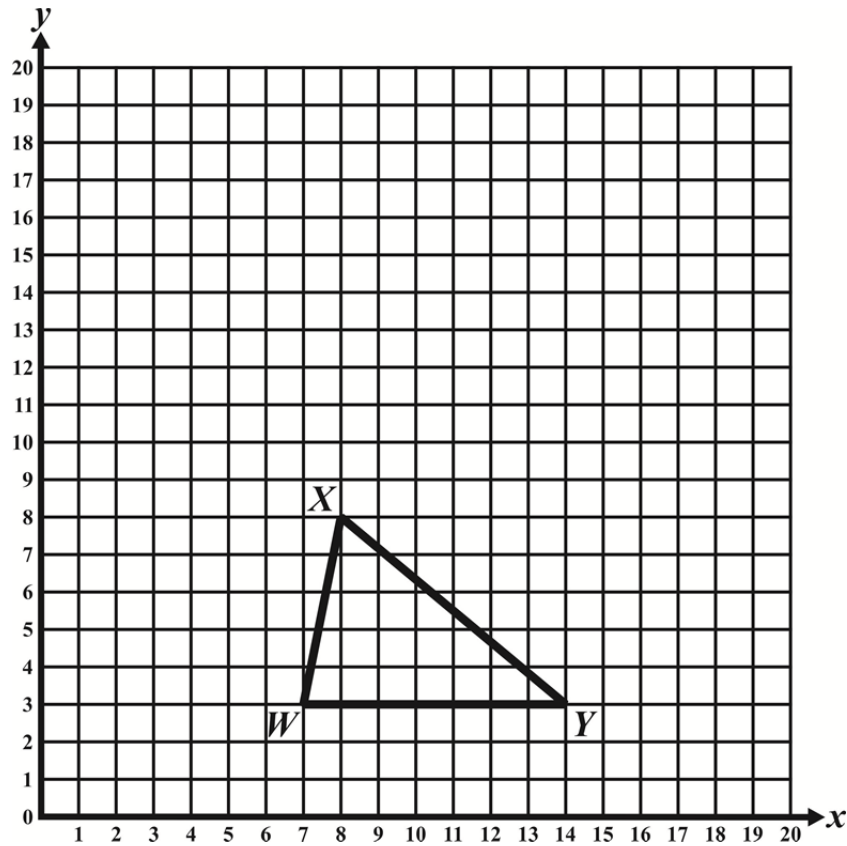
(C)  $0 \leq x \leq 3$

(D)  $-1 \leq x \leq 0$  or  $x \geq 3$



**QUESTION 19**

$\triangle WXY$  is graphed on the coordinate grid below.



Which set of coordinates represents the vertices of a triangle congruent to  $\triangle WXY$ ?

- (A) (2; 6), (2; 12), (7; 11)
- (B) (2; 6), (2; 13), (7; 12)
- (C) (3; 8), (3; 13), (8; 12)
- (D) (3; 8), (3; 14), (8; 11)

**QUESTION 20**

A play list on my iPod has 6 songs by female artists and 4 songs by male artists.

When I play the play list the songs are chosen at random and a song is not re-played until all the songs have been played.

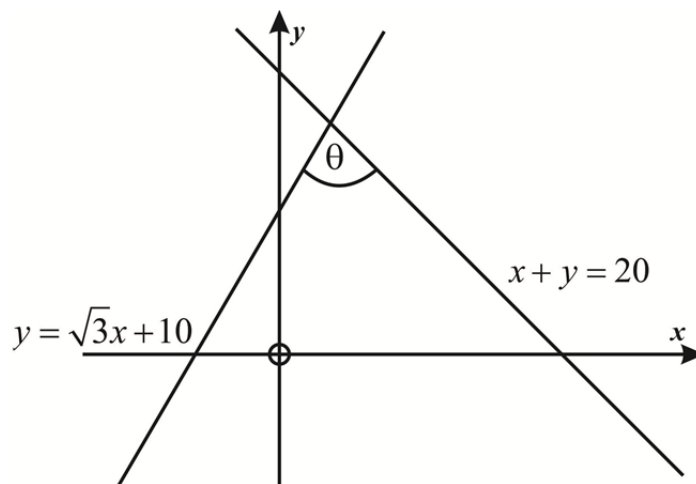
What is the probability that only one of the first two songs is by a female artist?

- (A) 24%
- (B)  $\frac{24}{90}$
- (C)  $\frac{24}{45}$
- (D) 48%

**QUESTION 21**

The lines in the diagram below have equations as indicated.

Determine the size of  $\theta$ .



- (A)  $45^\circ$                   (B)  $75^\circ$                   (C)  $60^\circ$                   (D)  $80^\circ$

**QUESTION 22**

The value of  $\sin^2 1^\circ + \sin^2 2^\circ + \sin^2 3^\circ + \dots + \sin^2 87^\circ + \sin^2 88^\circ + \sin^2 89^\circ$  is:

- (A)  $\sin^2(1^\circ + 2^\circ + \dots + 88^\circ + 89^\circ)$                   (B)  $44 + \frac{1}{\sqrt{2}}$   
 (C)  $44 - \frac{1}{\sqrt{2}}$                   (D)  $44\frac{1}{2}$

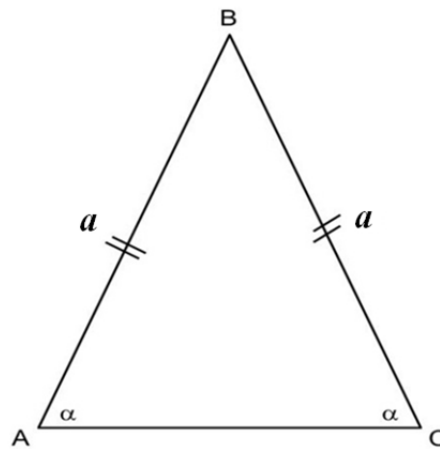
**QUESTION 23**

Which of the following are possible solutions for the equation:  $2 \sin^2 \theta - 1 = \cos \theta$ ?

- (A)  $\theta = -180^\circ$  or  $\theta = 360^\circ$                   (B)  $\theta = 0^\circ$  or  $\theta = 180^\circ$   
 (C)  $\theta = -60^\circ$  or  $\theta = -180^\circ$                   (D)  $\theta = 30^\circ$  or  $\theta = 120^\circ$

**QUESTION 24**

Consider isosceles triangle  $ABC$  with  $AB = BC = a$  and  $\hat{A} = \hat{C} = \alpha$ .



Which of the following statements is true?

- (A)  $\text{area} = a^2 \sin \alpha \cos \alpha$       (B)  $\text{area} = \frac{a^2 \cos 2\alpha}{2}$   
 (C)  $\text{area} = a^2 \sin \alpha$       (D)  $\text{area} = 2a^2(1 + \cos 2\alpha)$

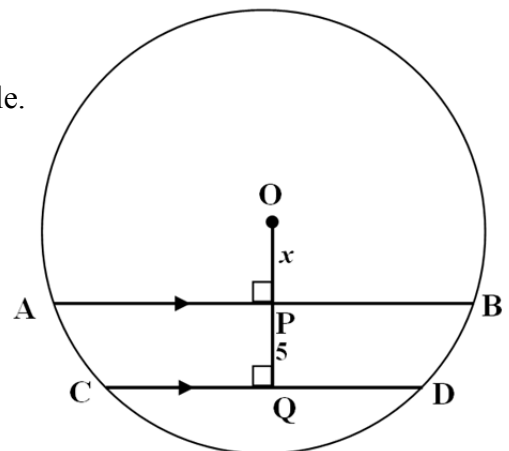
**QUESTION 25**

In the diagram, **not** drawn to scale,  $O$  is the centre of the circle.

$AB \parallel CD$ ;  $OP \perp AB$ ;  $OQ \perp CD$

$OP = x$  units and  $PQ = 5$  units.

$AB = 18$  units and  $CD = 12$  units



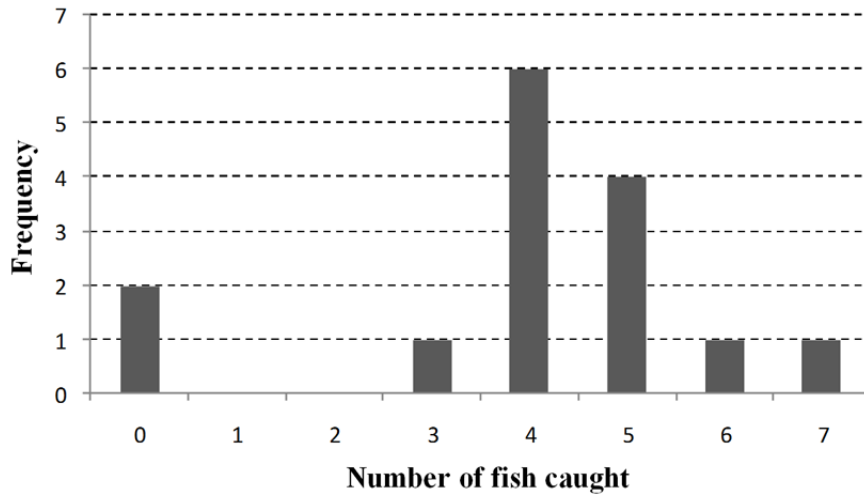
The value of  $x$  is:

- (A) 6 units      (B) 5 units      (C) 4 units      (D) 2 units

**QUESTION 26**

A fisherman recorded the number of fish that he caught on successive days.

The chart shows his results.



The **mean and median** number of fish caught were respectively:

- (A) 4 and 4      (B) 4,5 and 4,5      (C) 4 and 4,5      (D) 4,5 and 4

**QUESTION 27**

Solve for  $2^x$  if  $2^{x+1} + a^2 2^{2-x} = 9a$ .

- (A)  $2^x = a$  or  $2^x = 4a$
- (B)  $2^x = \frac{a}{2}$  or  $2^x = a$
- (C)  $2^x = \frac{a}{2}$  or  $2^x = \frac{a}{4}$
- (D)  $2^x = \frac{a}{2}$  or  $2^x = 4a$



**QUESTION 32**

A set of 25 data values has a mean of  $p$  and standard deviation of  $q$ .

Each data value is increased by  $c$  and the resulting value is then multiplied by  $d$ .

The **mean** of this 'adjusted' data set is:

- (A)  $d(q + c)$
- (B)  $dp + c$
- (C)  $dp$
- (D)  $d(p + c)$

**QUESTION 33**

Given:  $(x - 2)(x - k) = -4$

The values of  $k$  for which the equation will have real roots is:

- (A)  $-2 < k < 4$
- (B)  $k < 2$  of  $k > -4$
- (C)  $-2 \leq k \leq 6$
- (D)  $k \leq -2$  of  $k \geq 6$

**QUESTION 34**

The lines  $y = 2x - 1$  and  $y = mx + 1$  intersect below the line  $y = -3$ . It follows that:

- (A)  $m > -4$
- (B)  $-4 < m < 0$
- (C)  $2 < m < 4$
- (D)  $0 < m < 4$

**QUESTION 35**

If  $\frac{x}{y} = \frac{2}{3}$  then the **incorrect** expression in the following is:

- (A)  $\frac{y}{y-x} = 3$
- (B)  $\frac{x+y}{x} = \frac{5}{3}$
- (C)  $\frac{y+x}{y} = \frac{5}{3}$
- (D)  $\frac{x}{x-y} = -2$

**QUESTION 36**

The value of  $(-27)^{(-3)^{(-1)}}$  is:

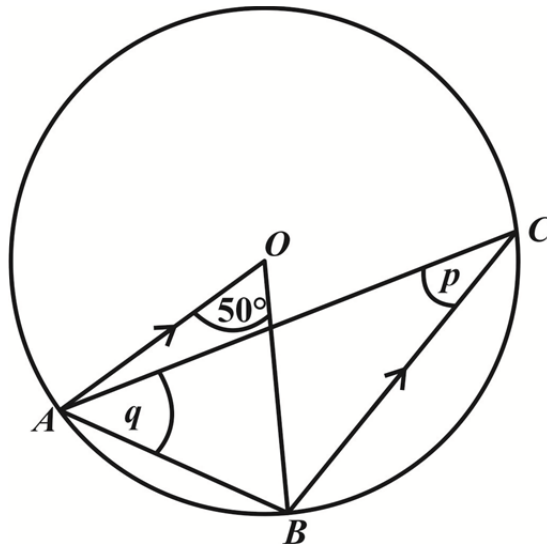
- (A)  $-\frac{1}{3}$
- (B) 81
- (C) 3
- (D) -3

**QUESTION 37**

O is the centre of the circle  $OA \parallel BC$ .

$$\widehat{AOB} = 50^\circ.$$

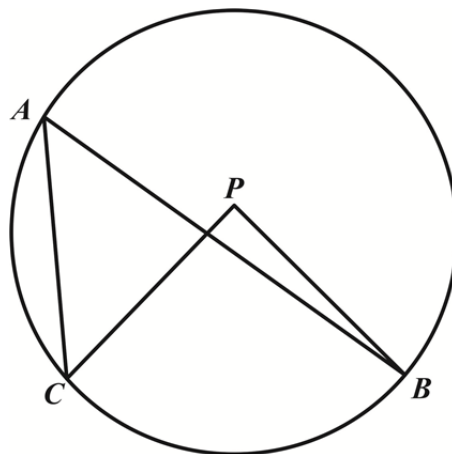
Find  $p + q$ .



- (A)  $45^\circ$       (B)  $50^\circ$       (C)  $65^\circ$       (D)  $75^\circ$

**QUESTION 38**

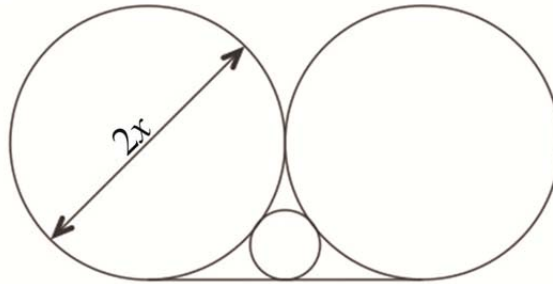
Given:  $\widehat{CAB} = x$  and reflex  $\widehat{CPB} = 360^\circ - 2x$ . Which of the following statement(s) is/are true?



- (A) P is the centre of the circle.  
 (B)  $\widehat{CPB} = 2\widehat{CAB}$   
 (C)  $2\widehat{CPB} = \widehat{CAB}$   
 (D) A and B are true.

**QUESTION 39**

All three circles are tangent to the horizontal line and to one another. The diameter of the big circles is  $2x$  and the diameter of the small circle is 2 units. Find the value of  $2x$ .



- (A) 12                      (B) 10                      (C) 8                      (D) 9

**QUESTION 40**

99 numbers have an average of 101. Ninety of these numbers have an average of 100. What is the average of the other nine numbers?

- (A) 102                      (B) 121                      (C) 111                      (D) 1 000