CANDIDATE – PLEASE NOTE!

PRINT your name on the line below and return this booklet with your answer sheet. Failure to do so may result in disqualification.

FORM TP 2021018

TEST CODE **01234010**

JANUARY 2021

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MATHEMATICS

Paper 01 – General Proficiency

1 hour 30 minutes

05 JANUARY 2021 (p.m.)

801

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 30 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. **A list of formulae is provided on page 2 of this booklet.**
4. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
5. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

Sample Item

$2a + 6a =$

(A) $8a$
(B) $8a^2$
(C) $12a$
(D) $12a^2$

Sample Answer

● (B) (C) (D)

A001

The best answer to this item is "$8a$", so (A) has been shaded.

6. If you want to change your answer erase it completely before you fill in your new choice.
7. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.
8. You may do any rough work in this booklet.
9. Calculators and mathematical tables are NOT allowed for this paper.
10. **ALL diagrams in this booklet are NOT drawn to scale, unless otherwise stated.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. What is the value of the digit 2 in the number 48.621?

(A) $\frac{2}{100}$

(B) $\frac{2}{10}$

(C) 2

(D) 200

2. $22.2 \div 0.02 =$

(A) 110
(B) 111
(C) 1 100
(D) 1 110

3. In standard notation, 208.06 is written as

(A) 2.0806×10^{2}
(B) 20.806×10^{1}
(C) 2.0806×10^{-2}
(D) 0.20806×10^{3}

4. In a school the ratio of the number of pupils to the number of teachers is 20:1. If the number of pupils is 840, how many teachers are there?

(A) 40
(B) 42
(C) 820
(D) 840

5. What is the LEAST number of apples that can be shared **equally** among either 6, 10 or 15 children?

(A) 24
(B) 30
(C) 60
(D) 90

6. If $4.3 \times 0.37 = 1.591$, then 0.43×370 is

(A) 1.591
(B) 15.91
(C) 159.1
(D) 1591.0

7. If $P = \{2, 3, 5, 7\}$,
$Q = \{2, 3, 6\}$ and
$S = \{2, 4, 5\}$,

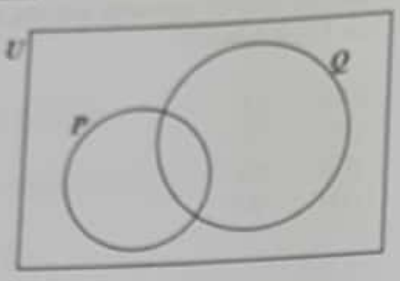
then $P \cap (Q \cup S) =$

(A) $\{2\}$
(B) $\{2, 3\}$
(C) $\{2, 3, 5\}$
(D) $\{2, 3, 4, 5, 6, 7\}$

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Item 8 refers to the following Venn diagram.



In the Venn diagram, $n(P) = 5$, $n(Q) = 9$ and $n(P \cup Q) = 10$.

8. What is $n(Q \cap P)$?

(A) 1
(B) 4
(C) 5
(D) 9

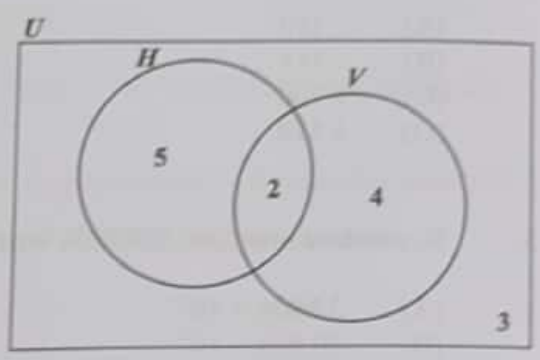
9. Which of the following pairs of sets is an example of disjoint sets?

(A) E = {even numbers} and F = {odd numbers}
(B) P = {multiples of 2} and Q = {multiples of 3}
(C) X = {whole numbers} and Y = {rational numbers}
(D) G = {multiples of five} and H = {multiples of ten}

10. All students in a class play Scrabble or Checkers or both. If 36% of the students play Scrabble only and 48% of the students play Checkers only, what percentage of students play BOTH games?

(A) 12
(B) 16
(C) 84
(D) 88

Item 11 refers to the following Venn diagram which shows 2 intersecting sets.



11. In the Venn diagram

U = {students who play games}
H = {students who play hockey}
V = {students who play volleyball}.

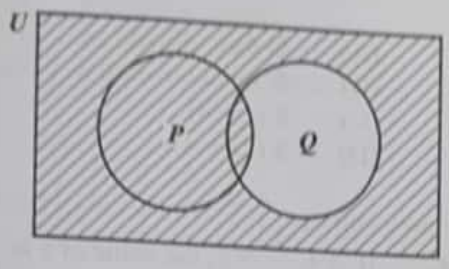
The number of students in each set is indicated. How many students play EXACTLY one game?

(A) 6
(B) 7
(C) 9
(D) 11

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Item 12 refers to the following Venn diagram of 2 intersecting sets which is partially shaded.



12. In the Venn diagram, the unshaded area represents

(A) P'
(B) Q'
(C) $P \cap Q'$
(D) $Q \cap P'$

13. For every \$100 sales, a salesman is paid \$10.00 as commission. If his sales for a particular month were \$1 020.00, how much commission was he paid?

(A) \$ 10.20
(B) \$ 20.20
(C) \$102.00
(D) \$110.00

14. At a store, sales tax is charged at a rate of 2% on the cost price of an item. The sales tax on a dress which costs \$180 is

(A) \$ 3.60
(B) \$ 10.80
(C) \$176.40
(D) \$183.60

15. If EC \$2.50 is equivalent to US \$1.00, then EC \$25.00, in US dollars, is

(A) \$ 5.00
(B) \$10.00
(C) \$62.50
(D) \$80.00

16. A calculator which is marked at \$120 is sold for cash at a 30% discount. How much change would Susan receive if she pays for the calculator with a \$100 bill?

(A) \$16
(B) \$20
(C) \$28
(D) \$36

17. A loan of \$8 000 was paid back in 2 years in monthly payments of \$400. The interest on the loan, as a percentage, was

(A) 5%
(B) $8\frac{1}{3}\%$
(C) $16\frac{2}{3}\%$
(D) 20%

18. A car presently valued at \$12 000 depreciates at the rate of 10% per annum. What will be the value of the car one year later?

(A) \$10 800
(B) \$11 800
(C) \$11 880
(D) \$13 200

19. A man pays 60 cents for every 200 m^3 of gas used, plus a fixed charge of \$13.75. How much does he pay when he uses 55 000 m^3 of gas?

(A) \$151.25
(B) \$165.00
(C) \$175.25
(D) \$178.75

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20. If \$7 000 is borrowed at the rate of 5% per annum for 3 years, the simple interest is

(A) \$ 105
(B) \$ 210
(C) \$ 350
(D) \$1 050

21. The product of a number p and its reciprocal may be written as

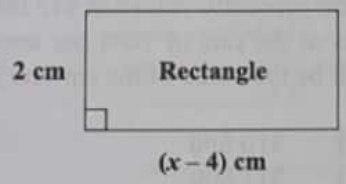
(A) $p^2 \times \frac{1}{p}$

(B) $p^2 \times -p$

(C) $p \times \frac{1}{p}$

(D) $p \times -p$

Item **22** refers to the following diagram of a rectangle.



22. The area of the rectangle, in cm^2, is x^2. The equation that may be used to find the value of x is

(A) $x^2 = 2(x - 4)$
(B) $x^2 = (x - 2)(x - 4)$
(C) $x^2 = (x - 4)(x + 2)$
(D) $x^2 = 2(x - 4)(x - 2)$

23. Althea normally saves \$x each month; but in June she saved \$4 more than **twice** her usual amount. In June she saved

(A) \$ $4x$
(B) \$ $6x$
(C) \$ $(x + 4)$
(D) \$ $(2x + 4)$

24. If $3 + \frac{2}{x} = 1$, the value of x is

(A) -1

(B) $\frac{1}{5}$

(C) $\frac{1}{2}$

(D) 5

25. $5^{n+1} \times 5^{n+2}$ is the same as

(A) 5^{2n}
(B) 5^{2n+3}
(C) $5^{3(2n)}$
(D) 2×5^{2n}

26. If $5(y - 2) - 3(y + 4) = 0$, then y is

(A) -1
(B) 3
(C) 7
(D) 11

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27. If $|A| = 0$, then A is

(A) an inverse matrix
(B) a singular matrix
(C) an identity matrix
(D) a non-singular matrix

28. If $A = \begin{pmatrix} 1 & 2 & 5 & 4 \\ 6 & 1 & 3 & 7 \\ -2 & 3 & 2 & 9 \end{pmatrix}$, then the order of A is

(A) 2×3
(B) 3×2
(C) 3×4
(D) 4×3

29. If the vectors **p** and **q** are $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$ and $\begin{bmatrix} -1 \\ 4 \end{bmatrix}$ respectively, then $-\mathbf{p} - 2\mathbf{q}$ is

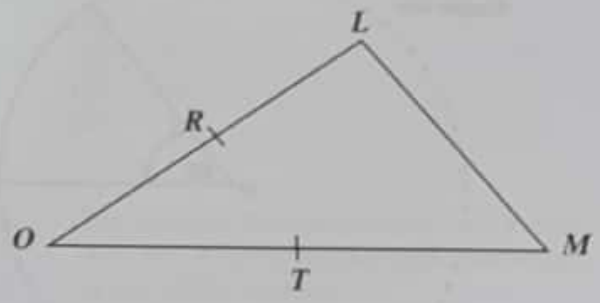
(A) $\begin{bmatrix} 5 \\ -6 \end{bmatrix}$

(B) $\begin{bmatrix} -2 \\ -6 \end{bmatrix}$

(C) $\begin{bmatrix} 5 \\ 10 \end{bmatrix}$

(D) $\begin{bmatrix} -1 \\ -10 \end{bmatrix}$

Item **30** refers to the following diagram of triangle OLM, in which R is the midpoint of OL and T the midpoint of OM. Further, $\overrightarrow{OR} = \mathbf{a}$ and $\overrightarrow{OT} = \mathbf{b}$.



30. $\overrightarrow{LM}$ expressed in terms of **a** and **b** is

(A) $b - a$
(B) $a + b$
(C) $2(a + b)$
(D) $2(b - a)$

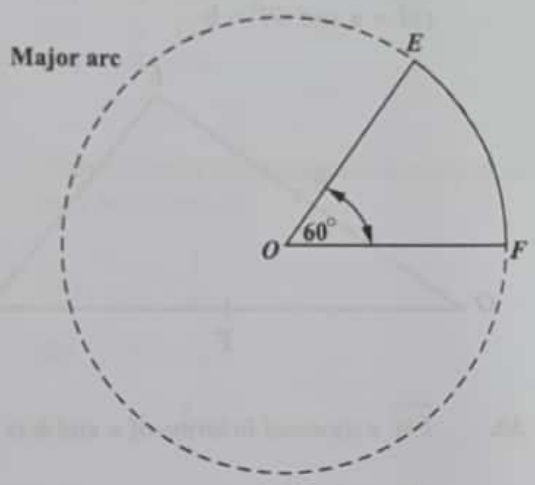
31. If it took a speedboat 9 hours to travel a distance of 1 080 km, what was its average speed, in kmh^{-1}?

(A) 12
(B) 102
(C) 120
(D) 1200

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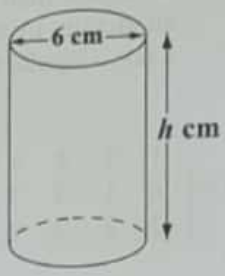
Item 32 refers to the following diagram which shows a circle, centred at O, and with a sector and the major and minor arcs indicated.



32. In the diagram, the length of the corresponding major arc, FE, is 40 cm. What is the circumference of the circle, in cm?

(A) 24
(B) 48
(C) 50
(D) 64

Item 33 refers to the following diagram which shows a cylinder with diameter 6 cm and height h cm.



33. If the volume of the cylinder, in terms of π, is 180π cm^3, then the height of the cylinder, in cm, is

(A) 9
(B) 20
(C) 30
(D) 36

34. The lengths of the sides of a triangle are x, $2x$ and $2x$ centimetres. If the perimeter is 20 centimetres, what is the value of x?

(A) 4
(B) 5
(C) 8
(D) 10

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35. Fifty guests had 2 glasses of champagne each. Each glass held 150 millilitres. How many litres of champagne were used?

(A) 0.15
(B) 1.5
(C) 15
(D) 150

36. A square has the same area as a rectangle with sides of length 9 centimetres and 16 centimetres. What is the length of the side of the square?

(A) 9 cm
(B) 12 cm
(C) 12.5 cm
(D) 75 cm

37. The circumference of a circle is 154 cm.

Given that $\pi = \frac{22}{7}$, the diameter of the circle, in centimetres, is

(A) 7
(B) 24.5
(C) 49
(D) 54

38. The area of a triangle is 60 cm^2 and its base is 12 cm. What is the perpendicular height, in cm, of the triangle?

(A) 5
(B) 10
(C) 13
(D) 17

Item **39** refers to the following table which shows the number of books 58 students bought at a sale.

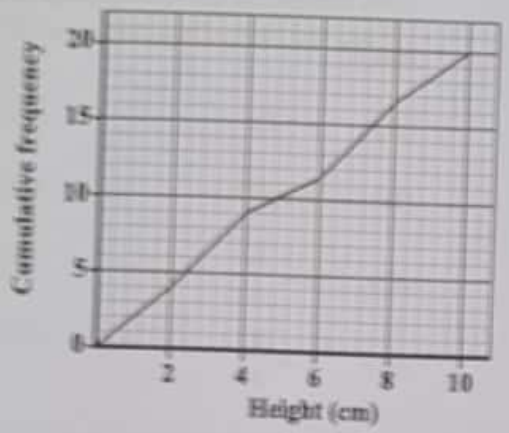
No. of Books Bought	3	4	5	6	7	8
No. of Students	9	9	13	11	9	7

39. The mode of the number of books bought is

(A) 5
(B) 7
(C) 9
(D) 13

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Item **43** refers to the following diagram which shows the cumulative frequency curve of the heights of 20 plants.



43. The interquartile range of the set of measurements is

(A) 2.4 cm
(B) 5.0 cm
(C) 7.4 cm
(D) 10.0 cm

Item **44** refers to the following table which shows the results of a survey of 100 persons from 2 major ethnic groups, *P* and *R*. Respondents were interviewed about their attitude towards Mathematics.

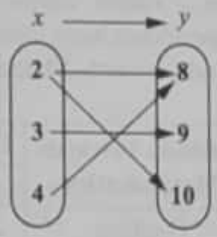
Attitude Towards Mathematics	Ethnicity		Total
	P	*R*	
Positive	25	12	37
Neutral	11	9	20
Negative	24	19	43
Total	60	40	100

44. A respondent from ethnic Group P is selected at random. What is the probability that he has a negative attitude towards Mathematics?

(A) $\frac{11}{100}$
(B) $\frac{6}{25}$
(C) $\frac{1}{4}$
(D) $\frac{2}{5}$

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Item **45** refers to the following arrow diagram.



45. The arrow diagram above describes the relation

(A) y is less than x
(B) y is a factor of x
(C) x is a factor of y
(D) x is a multiple of y

46. The set of ordered pairs below represents a relation that is a function.

$\{(-2, 7), (4, 6), (10, 4)\}$

Which of the following points, when added to the set, would form a relation that is NOT a function?

(A) $(1, 3)$
(B) $(0, 4)$
(C) $(-2, 8)$
(D) $(-8, 10)$

47. If $h(x) = \frac{3x - 2}{5}$, then $h(-6) =$

(A) -4
(B) $\frac{-16}{5}$
(C) $\frac{16}{5}$
(D) 4

48. Given that y varies inversely as x, and $y = 16$ when $x = \frac{1}{2}$, which of the following equations represents the relationship between x and y?

(A) $y = 8x$
(B) $y = 32x$
(C) $y = \frac{32}{x}$
(D) $y = \frac{8}{x}$

49. Which of the following represents the equation of a straight line?

(A) $xy = 4$
(B) $y + 4 = x^2$
(C) $y + 3 = 2x$
(D) $y = x^2 + 2x - 5$

50. What is the x-value of the point of intersection for the system represented by the functions

$f(x) = 3$ and $g(x) = \frac{5}{2}x + 1$?

(A) 0.8
(B) 1.6
(C) 5.0
(D) 8.5



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51. A line L is parallel to the line

$$2x - 5y - 8 = 0.$$

What is the gradient of the line L?

(A) $-\frac{5}{2}$

(B) $-\frac{2}{5}$

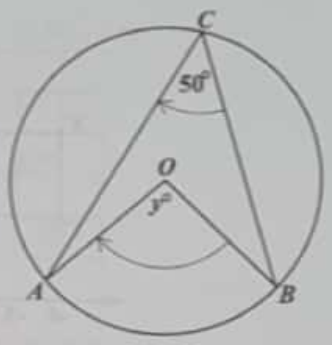
(C) $\frac{2}{5}$

(D) 2

52. Which of the following sets is represented by the function $f: x \rightarrow x^2 + 3$ where $x \in \{0, 1, 2, 3\}$?

(A) $\{(0, 3), (1, 1), (2, 4), (3, 9)\}$
(B) $\{(0, 3), (1, 4), (2, 5), (3, 6)\}$
(C) $\{(0, 3), (1, 5), (2, 7), (3, 9)\}$
(D) $\{(0, 3), (1, 4), (2, 7), (3, 12)\}$

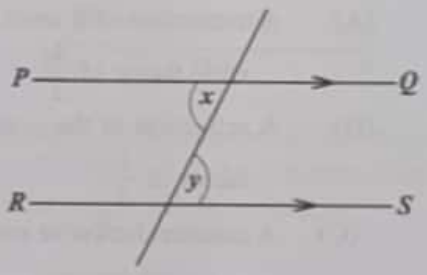
Item 53 refers to the following diagram of a circle.



53. If O is the centre of the circle, then $y°$ is

(A) 25°
(B) 80°
(C) 90°
(D) 100°

Item 54 refers to the following diagram.

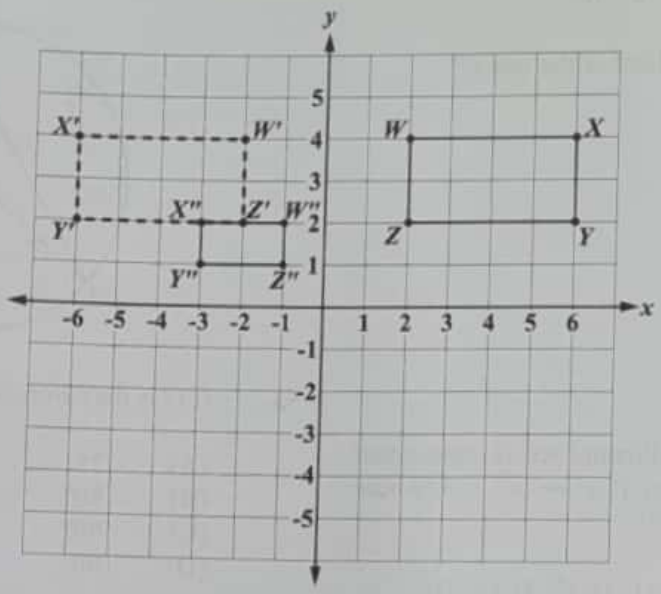


54. In the diagram PQ and RS are parallel. Which of the following BEST describes the relation between x and y?

(A) $x = y$
(B) $x < y$
(C) $x + y = 90°$
(D) $x + y = 180°$

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Item 55 refers to the following diagram which shows rectangle $WXYZ$ and its image $W'X'Y'Z'$ and $W''X''Y''Z''$ after it undergoes a composite/double transformation.



55. What sequence of transformations will map rectangle $WXYZ$ onto its image, rectangle $W''X''Y''Z''$?

(A) A translation of 8 units to the left, followed by an enlargement, centred at the origin with scale factor of $\frac{1}{2}$

(B) A reflection in the y-axis, followed by an enlargement, centred at the origin with scale factor of $\frac{1}{2}$

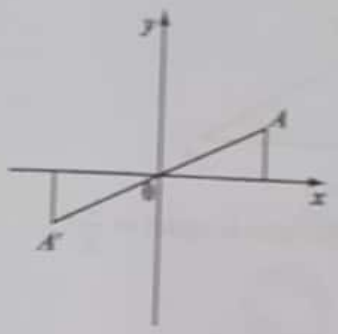
(C) A counterclockwise rotation of 90° about the origin, followed by an enlargement, centred at the origin with scale factor of $\frac{1}{2}$

(D) An enlargement, centred at the origin with scale factor of $\frac{1}{2}$, followed by a counterclockwise rotation of 90° about the origin

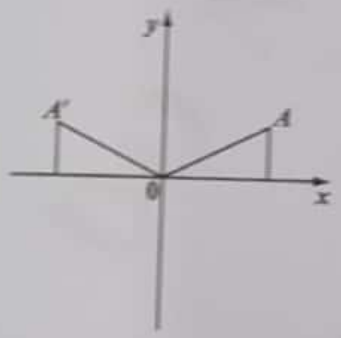
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56. In each of the following diagrams, A' is the image of A. Which of the diagrams shows a reflection in the x-axis?

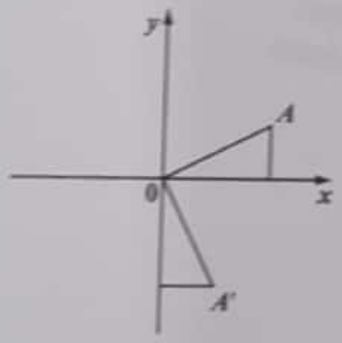
(A)



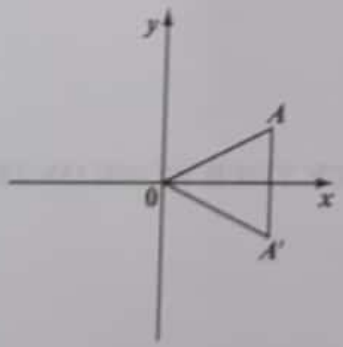
(B)



(C)



(D)



57. In triangle ABC, angle $A = x°$ and angle $B = 2x°$. What is the size of angle C?

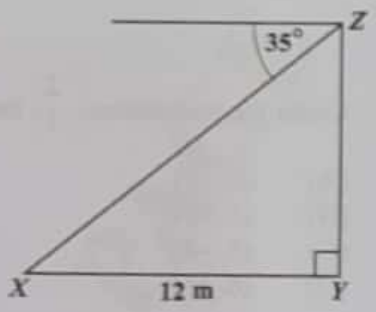
(A) $(180 - 3x)°$

(B) $60°$

(C) $30°$

(D) $\left[\frac{180}{3x}\right]°$

Item 58 refers to the following diagram which shows the angle of depression of a point, X, from Z.

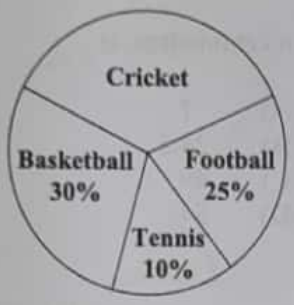


58. The angle of depression of the point X from Z is 35°. If X is 12 metres from Y, then the height YZ, in metres, is

(A) $12 \cos 35°$
(B) $12 \tan 35°$
(C) $12 \sin 35°$
(D) $12 \cos 55°$

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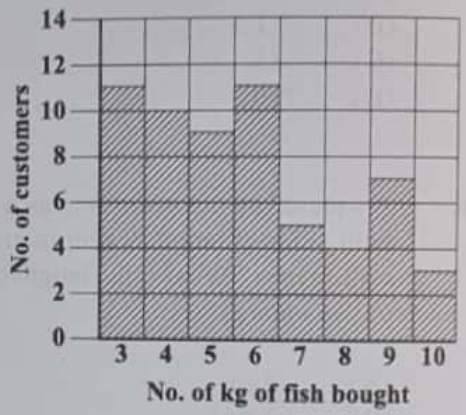
Item **40** refers to the following pie chart which shows the popular games played by 720 students.



40. How many students play cricket?

(A) 35
(B) 120
(C) 252
(D) 300

Items **41–42** refer to the following chart which shows the amount of fish bought, in kg, by the first 60 customers at a fish market.



41. How many customers bought at LEAST 6 kg of fish?

(A) 18
(B) 19
(C) 34
(D) 30

42. The median amount of fish bought by customers is

(A) 5.5 kg
(B) 6 kg
(C) 6.5 kg
(D) 30 kg

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