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 2020091

TEST CODE **01234010**

MAY/JUNE 2020

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

MATHEMATICS

Paper 01 – General Proficiency

1 hour 30 minutes

13 MAY 2020 (p.m.)

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 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)

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.

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

1. $(-3)^2 + (-2)^2$ is equal to

(A) −13
(B) −10
(C) 5
(D) 13

2. 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

3. Using the distributive property

$$49 \times 17 + 49 \times 3 =$$

(A) 49×20
(B) $49 + 20$
(C) 52×66
(D) $52 + 66$

4. A total of 540 beads are shared in the ratio 4:5. The LARGER share of beads is

(A) 60
(B) 240
(C) 300
(D) 432

5. 0.45 written as a common fraction, in its simplest form, is

(A) $\frac{9}{20}$
(B) $\frac{4}{5}$
(C) $\frac{9}{10}$
(D) $\frac{5}{4}$

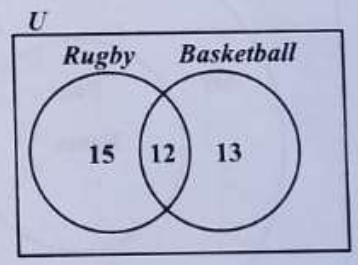
6. Dan sold 40 concert tickets in 5 days. Each day he sold 3 tickets MORE than the previous day. The number of tickets he sold on the third day is

(A) 8
(B) 9
(C) 10
(D) 11

M T W T F
x x+3 x+6 x+9 x+12 =40

5x+30=40
x=2 2+6=8

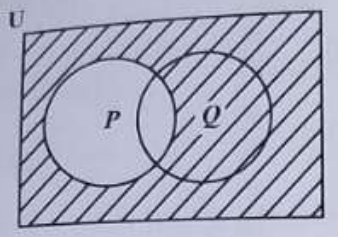
Item 7 refers to the following Venn diagram which shows the number of members of a sports club who play rugby or basketball.



7. The number of members who play rugby but NOT basketball is

(A) 12
(B) 15
(C) 28
(D) 40

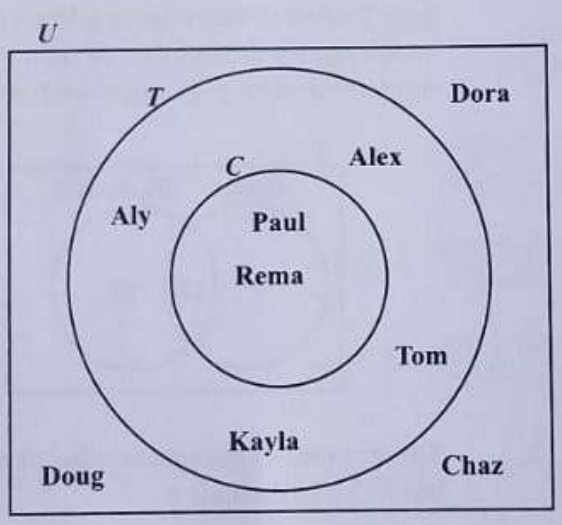
Item 8 refers to the following Venn diagram.



8. The shaded region represents

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

Items 9–10 refer to the following Venn diagram which shows the universal set (U), and two sets, T and C, that represent the students in a class who play tennis (T) and chess (C).



9. How many students play BOTH games?

(A) 2
(B) 3
(C) 4
(D) 6

10. How many students play EXACTLY one game?

(A) 2
(B) 3
(C) 4
(D) 6

Item 11 refers to the following information on the description of 3 sets.

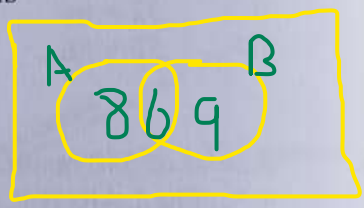
P = {prime numbers}
Q = {odd numbers}
R = {even numbers}

11. Which of the following sets is empty?

(A) $P \cap R$
(B) $P \cup Q$
(C) $P \cap Q$
(D) $Q \cap R$

12. If $n(A) = 14$, $n(B) = 15$, and $n(A \cap B) = 6$, then $n(A \cup B)$ is

(A) 2
(B) 19
(C) 23
(D) 29



8+6+9=23

13. A dress which costs $180 is being sold at a discount of 10%. The amount of the discount is

(A) $ 1.80
(B) $ 10.00
(C) $ 18.00
(D) $170.00

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14. A dinner at a restaurant was advertised at $60 plus 18% tax. The total bill for this dinner was

(A) $60.00
(B) $70.80
(C) $78.00
(D) $81.60

15. The cost price of a refrigerator is $1 850.00. A buyer who is given a discount of 5% for a cash purchase will pay

(A) $1 942.50
(B) $1 845.00
(C) $1 757.50
(D) $ 1350.00

16. The annual interest rate on a mortgage on a house assessed at a value of $450 000 is 5 cents on every $1. What is the interest paid on the mortgage for the first year?

(A) $ 11 750
(B) $ 22 500
(C) $107 500
(D) $117 500

17. The simple interest on a sum of money invested at 5% per annum for 3 years was $90.

The sum of money invested was

(A) $ 54
(B) $ 150
(C) $ 600
(D) $1350

18. At the end of any year a car is worth 5% less than what it was worth at the beginning of the year. If a car is worth $9 500 in December 2016, then its value in January 2016 was

(A) $ 9 025
(B) $ 9 995
(C) $10 000
(D) $10 025

19. A television set costs $350 cash. When bought on hire purchase, a deposit of $35 is required, followed by 12 monthly payments of $30 each. How much is saved by paying cash?

(A) $10
(B) $25
(C) $40
(D) $45

20. A man's regular pay is $3 per hour up to 40 hours. Overtime is twice the payment for regular time. If he was paid $216, how many hours of overtime did he work?

(A) 8
(B) 16
(C) 28
(D) 48

21. $3x - 4(x + 6) =$

(A) $-x + 6$
(B) $-x - 24$
(C) $-7x + 6$
(D) $-7x - 24$

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22. If $5(2x - 1) = 35$, then $x =$

(A) -4
(B) $\frac{1}{4}$
(C) 3
(D) 4

23. If x is an integer that satisfies the inequality $4 < 2x \leq 6$, then

(A) $2 < x \leq 3$
(B) $2 < x \leq 6$
(C) $4 < x \leq 3$
(D) $4 < x \leq 6$

24. Given that $3 * 6 = 12$ and $2 * 5 = 9$, then $a * b$ may be defined as

(A) $4(b - a)$
(B) $a^2 - b$
(C) $6a - b$
(D) $2a + b$

25. If $p + q = -1$ and $pq = -6$, then $p^3 + q^3 =$

(A) -19
(B) -13
(C) 25
(D) 35

26. The distance L that an elastic string is stretched by hanging an object of mass m varies directly as the mass of that object. If a 5-kg object stretches the string 31 cm, how far will a 29-kg object stretch the string?

(A) 4.68 cm
(B) 6.2 cm
(C) 135.72 cm
(D) 179.8 cm

27. Given that $A = \begin{bmatrix} 1 & 3 & -3 \\ 3 & 0 & 5 \end{bmatrix}$, then $3A$ equals

(A) $\begin{bmatrix} 3 & 9 & -9 \\ 9 & 0 & 15 \end{bmatrix}$

(B) $\begin{bmatrix} 4 & 6 & -6 \\ 6 & 3 & 8 \end{bmatrix}$

(C) $\begin{bmatrix} 3 & 9 & -6 \\ 9 & 0 & 15 \end{bmatrix}$

(D) $\begin{bmatrix} -2 & 0 & 6 \\ 0 & 3 & 2 \end{bmatrix}$

Item **28** refers to the following matrix, P.

$$P = \begin{bmatrix} 8 & 6 \\ 7 & 5 \end{bmatrix}$$

28. The determinant of P, $|P|$, is

(A) 2
(B) -2
(C) -13
(D) 26

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Item 29 refers to the following vectors, **p** and **q**.

$$\mathbf{p} = \begin{bmatrix} 3 \\ 7 \end{bmatrix} \qquad \mathbf{q} = \begin{bmatrix} -2 \\ 5 \end{bmatrix}$$

29. The vector **p** – **q** is represented by

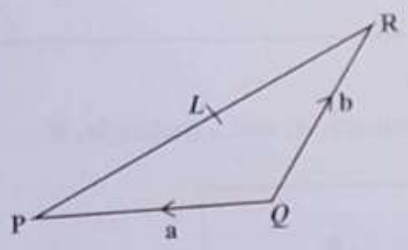
(A) $\begin{bmatrix} 1 \\ 12 \end{bmatrix}$

(B) $\begin{bmatrix} 5 \\ 12 \end{bmatrix}$

(C) $\begin{bmatrix} 5 \\ 2 \end{bmatrix}$

(D) $\begin{bmatrix} 1 \\ 5 \end{bmatrix}$

Item 30 refers to the following diagram of triangle PQR, in which L is the midpoint of PR and $\overrightarrow{QP} = \mathbf{a}$ and $\overrightarrow{QR} = \mathbf{b}$.



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

(A) $\frac{(\mathbf{a} + \mathbf{b})}{2}$

(B) $\frac{(\mathbf{b} - \mathbf{a})}{2}$

(C) $\frac{(-\mathbf{b} - \mathbf{a})}{2}$

(D) $\frac{(\mathbf{a} - \mathbf{b})}{2}$

31. The length 3 800 millimetres expressed in metres is

(A) 0.38
(B) 3.8
(C) 38
(D) 380

32. The volume of a cube with edge 10 cm is

(A) 30 cm^3
(B) 100 cm^3
(C) 300 cm^3
(D) 1 000 cm^3

33. The distance around the edge of a circular pond is 88 metres. The radius, in metres, is

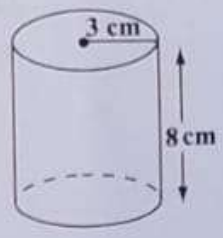
(A) 88π

(B) 176π

(C) $\frac{88}{\pi}$

(D) $\frac{88}{2\pi}$

Item 34 refers to the following diagram, **not drawn to scale**, which shows a cylinder of radius 3 cm and height 8 cm.



$V = r^2 h$
$= (3)^2 8\text{cm}$
$= 72\text{cm}^3$

34. The volume of the cylinder is

(A) 12 π cm^3
(B) 48 π cm^3
(C) 72 π cm^3
(D) 192 π cm^3

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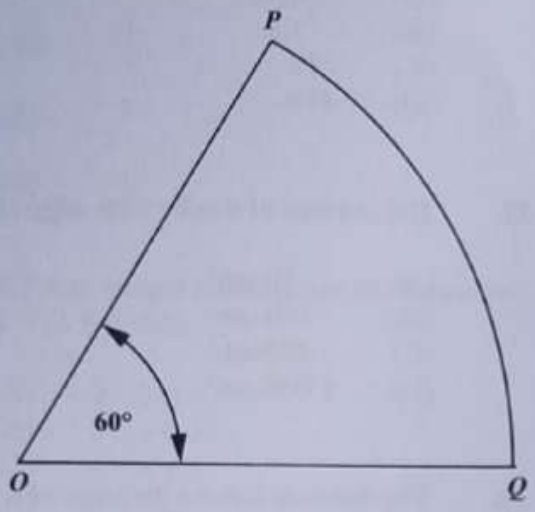
Item 35 refers to the following diagram, **not drawn to scale**, which shows a sector of a circle with centre O.



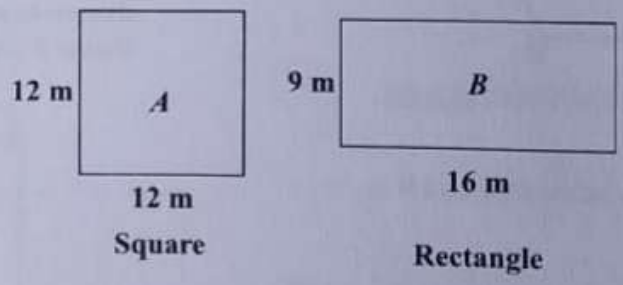
35. If the length of the minor arc PQ is 8 cm, what is the circumference of the circle?

(A) 16 cm
(B) 24 cm
(C) 48 cm
(D) 64 cm

36. A man leaves home at 22:15 hours and reaches his destination at 04:00 hours on the following day in the same time zone. How many hours did the journey take?

(A) 5
(B) $5\frac{3}{4}$
(C) 6
(D) $6\frac{1}{4}$

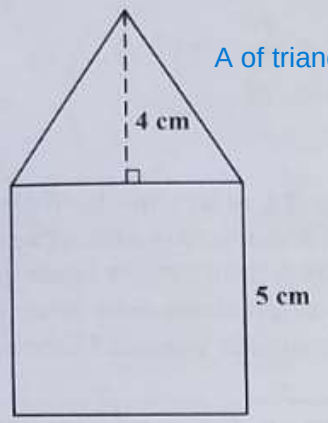
Item 37 refers to the following diagram which shows a square, A, and a rectangle, B.



37. Which of the following statements is true about the perimeters of the figures A and B?

(A) Perimeter of A = perimeter of B
(B) Perimeter of A < perimeter of B
(C) Perimeter of $A \geq$ perimeter of B
(D) Perimeter of $A >$ perimeter of B

Item **38** refers to the following diagram, **not drawn to scale**, which consists of a triangle resting on a square of side 5 cm.

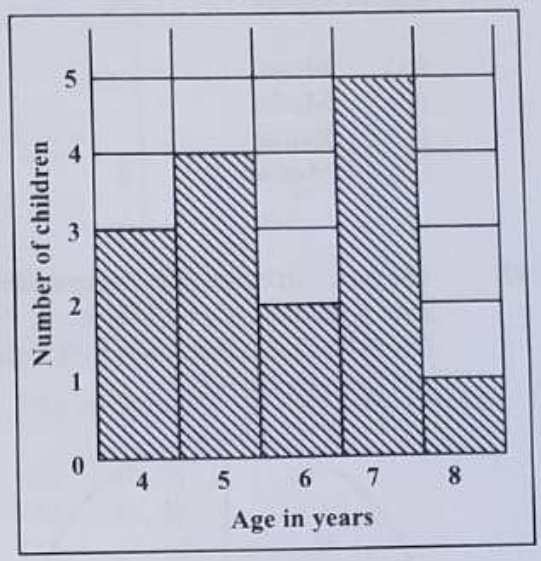


A of triangle= 1/2 b*h

38. If the height of the triangle is 4 cm, what is the TOTAL area of the figure?

(A) 35 cm^2
(B) 45 cm^2
(C) 50 cm^2
(D) 100 cm^2

Items **39–40** refer to the following histogram which shows the number of children aged 4, 5, 6, 7 and 8 who took part in a survey.



39. What was the modal age?

(A) 5
(B) 6
(C) 7
(D) 8

40. How many children took part in the survey?

(A) 5
(B) 15
(C) 75
(D) 87

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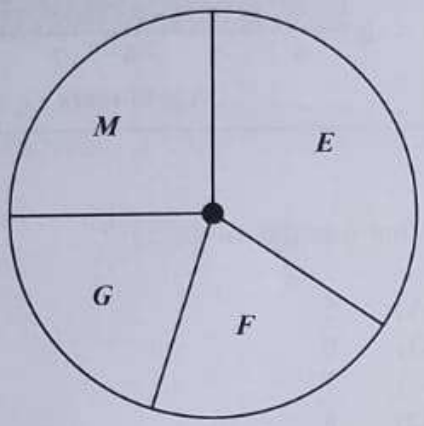
41. Ms Clarke arranged the 15 test scores of her students in order of size and selected the 8th score for reporting purposes. Which of the following statistical measures did Ms Clarke obtain?

(A) Mean
(B) Mode
(C) Range
(D) Median

42. The pie chart below, **drawn to scale**, shows how a student used 12 hours in studying English (E), Mathematics (M), French (F) and Geography (G).



The amount of time spent studying Mathematics is APPROXIMATELY

(A) 1 hour
(B) 2 hours
(C) 3 hours
(D) 4 hours

43. If the mean of the 4 numbers 4, 8, x and 12 is 10, then x is

(A) 4
(B) 10
(C) 12
(D) 16

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 is selected at random. What is the probability that he has a positive attitude towards Mathematics?

(A) 0.20
(B) 0.37
(C) 0.43
(D) 0.60

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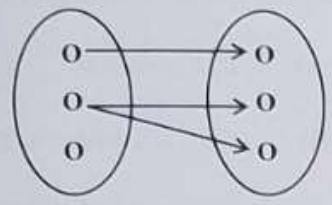
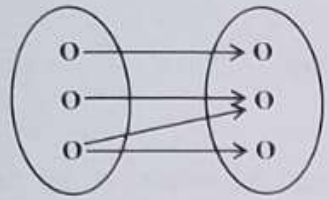
45. Which of the following diagrams BEST illustrates a function?

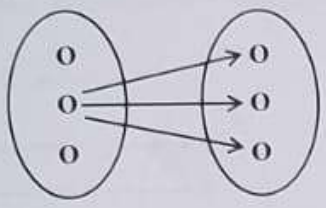
(A)



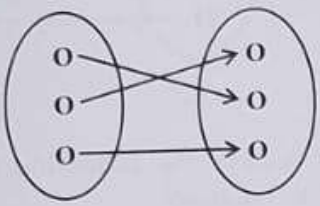
(B)



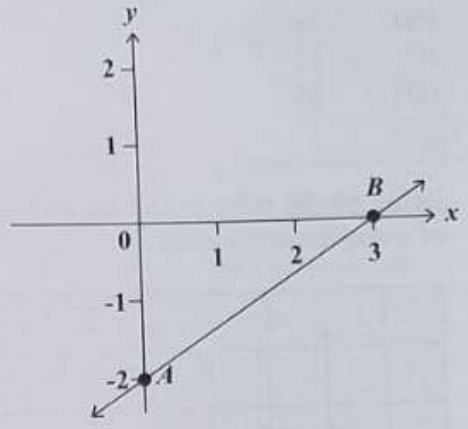
(C)



(D)



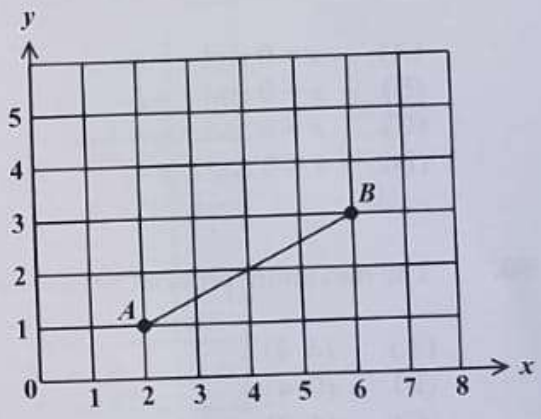
Item 46 refers to the following graph of a straight line.



46. The straight line AB cuts the y-axis at

(A) (0, 3)
(B) (0, 2)
(C) (3, −2)
(D) (0, −2)

Item 47 refers to the following graph of a straight line.



47. The gradient of AB in the graph above is

(A) $-\frac{1}{2}$

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

(C) -2

(D) 2

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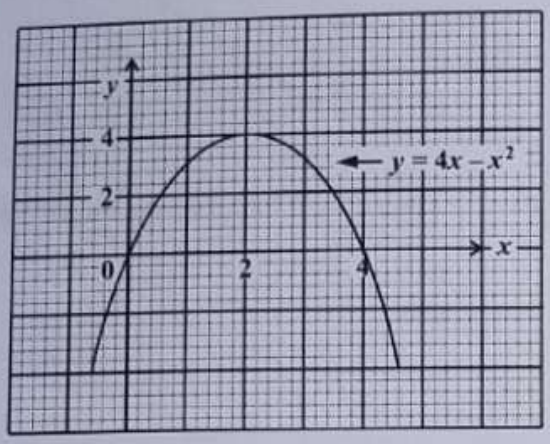
48. If $f(x) = 2x^2 - 1$, then $f(-3) =$

(A) −32
(B) −19
(C) 17
(D) 35

Items **49–50** refer to the following graph of a quadratic function.



49. The values of x at the points where the curve $y = 4x - x^2$ intersects the line $y = 0$ are

(A) $x = 0$ and $x = 4$
(B) $x = 0$ and $x = 2$
(C) $x = 0$ and $x = -4$
(D) $x = 2$ and $x = 4$

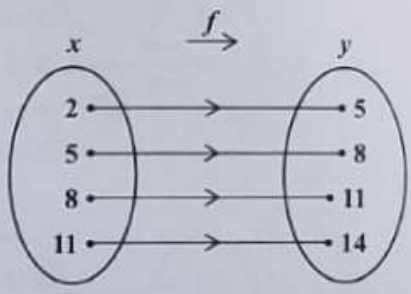
50. The maximum point of $y = 4x - x^2$ is

(A) (4, 4)
(B) (0, 4)
(C) (4, 2)
(D) (2, 4)

51. A parking lot charges \$1.00 plus \$0.25 for every hour (h) or part thereof in which a vehicle is parked. A function, $C(h)$, that represents the parking cost is

(A) $C(h) = 0.25h$
(B) $C(h) = 1.00h + 0.25$
(C) $C(h) = 0.25h + 1.00$
(D) $C(h) = \frac{h}{0.25} + 1.00$

Item **52** refers to the following arrow diagram which shows a function, f.



52. Which of the following BEST describes the function?

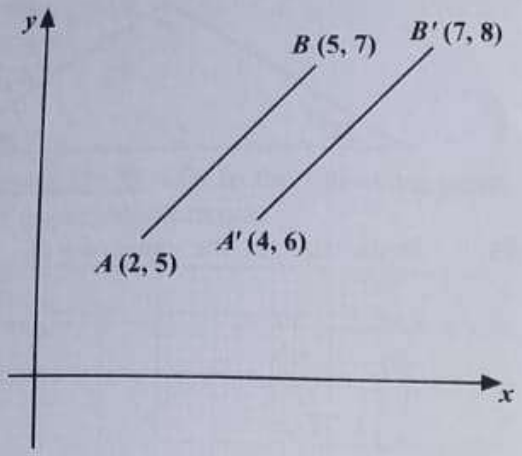
(A) $y = x + 3$
(B) $x + y = 3$
(C) $x = y + 3$
(D) $y = 2x + 1$

53. If the sum of the interior angles of a polygon is 4 right angles, then the polygon is a

(A) triangle
(B) hexagon
(C) pentagon
(D) quadrilateral

54. C 55. C 56. B

Item 57 refers to the following diagram which shows a transformation.



57. In the diagram, the translation by which AB is mapped onto $A'B'$ is represented by

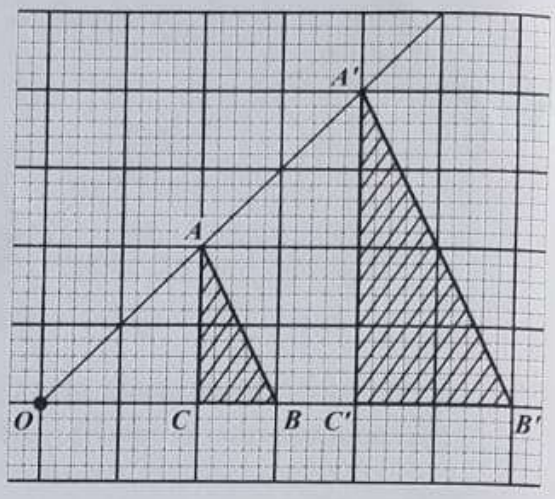
(A) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

(B) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$

(C) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$

(D) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$

Item 58 refers to the following diagram which shows a transformation.



58. OAA', OBB' and OCC' are straight lines. ΔABC is mapped onto $\Delta A'B'C'$ by an enlargement with centre O. What is the scale factor of the enlargement?

(A) -2

(B) $-\frac{1}{2}$

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

(D) 2

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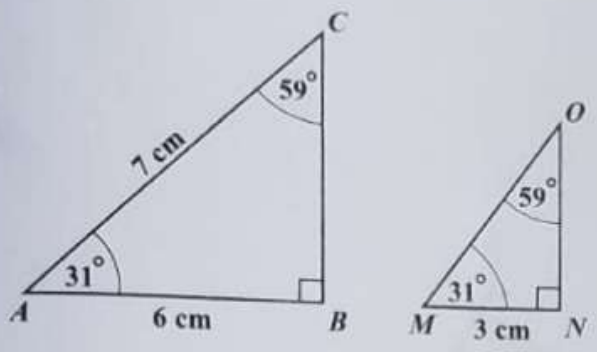
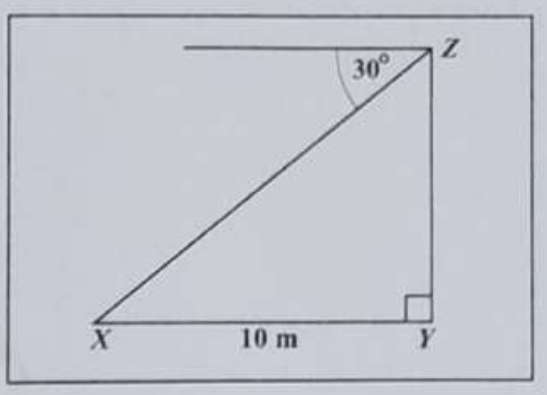
Item 59 refers to the following pair of similar triangles.



59. The length of MO, in centimetres, is

(A) 2.5
(B) 3.0
(C) 3.5
(D) 7.0

Item 60 refers to the following diagram.



60. The diagram above, **not drawn to scale**, shows that the angle of depression of a point X from Z is 30°. If X is 10 metres from Y, the height of YZ, in metres, is

(A) 10 tan 30°
(B) 10 sin 30°
(C) 10 cos 30°
(D) 10 cos 60°

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.