



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.

TEST CODE **01234010**

JANUARY 2024

FORM TP 2024019

**CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION**

MATHEMATICS

Paper 01 – General Proficiency

1 hour 30 minutes

23 JANUARY 2024 (a.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

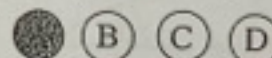
1. This test consists of 60 items. You will have 1 hour and 30 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. A list of formulae is provided on page 2 of this booklet.
4. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read 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



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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01234010/J/CSEC 2024

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A004

LIST OF FORMULAE

Volume of a prism	$V = Ah$ where A is the area of the cross-section and h is the perpendicular length.
Volume of a cylinder	$V = \pi r^2 h$ where r is the radius of the base and h is the perpendicular height.
Volume of a right pyramid	$V = \frac{1}{3} Ah$ where A is the area of the base and h is the perpendicular height.
Circumference	$C = 2\pi r$ where r is the radius of the circle.
Arc length	$S = \frac{\theta}{360} \times 2\pi r$ where θ is the angle subtended by the arc, measured in degrees.
Area of a circle	$A = \pi r^2$ where r is the radius of the circle.
Area of a sector	$A = \frac{\theta}{360} \times \pi r^2$ where θ is the angle of the sector, measured in degrees.
Area of a trapezium	$A = \frac{1}{2} (a + b) h$ where a and b are the lengths of the parallel sides and h is the perpendicular distance between the parallel sides.
Roots of quadratic equations	If $ax^2 + bx + c = 0$,

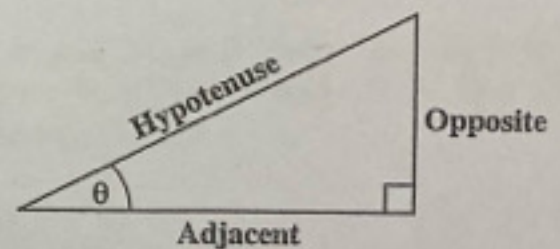
$$\text{then } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric ratios

$$\sin \theta = \frac{\text{length of opposite side}}{\text{length of hypotenuse}}$$

$$\cos \theta = \frac{\text{length of adjacent side}}{\text{length of hypotenuse}}$$

$$\tan \theta = \frac{\text{length of opposite side}}{\text{length of adjacent side}}$$



Area of a triangle

Area of $\Delta = \frac{1}{2} bh$ where b is the length of the base and h is the perpendicular height.

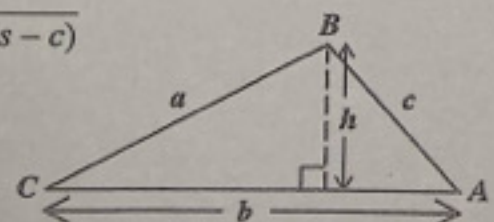
$$\text{Area of } \Delta ABC = \frac{1}{2} ab \sin C$$

$$\text{Area of } \Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{where } s = \frac{a+b+c}{2}$$

Sine rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



Cosine rule

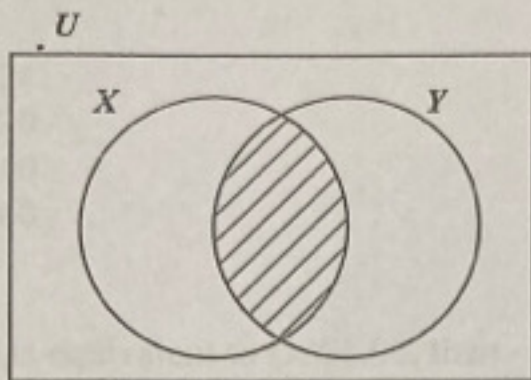
$$a^2 = b^2 + c^2 - 2bc \cos A$$

GO ON TO THE NEXT PAGE



1. The number 3.14063 written correct to 3 decimal places is
- (A) 3.140
(B) 3.141
(C) 3.146
(D) 3.150
2. What percentage of 40 is 8?
- (A) 5
(B) 20
(C) 32
(D) 150
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. 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
5. If \$350 is shared in the ratio 2:5, the LARGER share is
- (A) \$ 50
(B) \$ 70
(C) \$100
(D) \$250
6. There are 40 students in a class. Girls make up 60% of the class. 25% of the girls wear glasses. How many girls in the class wear glasses?
- (A) 6
(B) 8
(C) 10
(D) 15
7. If the universal set $U = \{1, 2, 3, 4, 5, 6\}$ and $H = \{3, 4, 6\}$, then $H' =$
- (A) $\{1, 3, 5\}$
(B) $\{1, 2, 5\}$
(C) $\{2, 4, 6\}$
(D) $\{3, 4, 6\}$
8. Which of the following statements describes the set of integers from -3 to 6?
- (A) $\{x : -3 > x > 6, x \in Z\}$
(B) $\{x : -3 \geq x \geq 6, x \in Z\}$
(C) $\{x : -3 \leq x \leq 6, x \in Z\}$
(D) $\{x : -3 < x < 6, x \in Z\}$
9. If X and Y are 2 finite sets such that $n(X) = 9$, $n(Y) = 10$ and $n(X \cup Y) = 15$, then $n(X \cap Y)$ is
- (A) 4
(B) 6
(C) 10
(D) 19

Item 10 refers to the following Venn diagram.



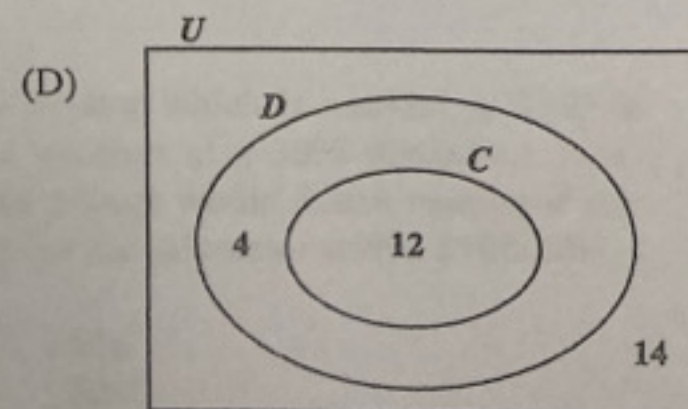
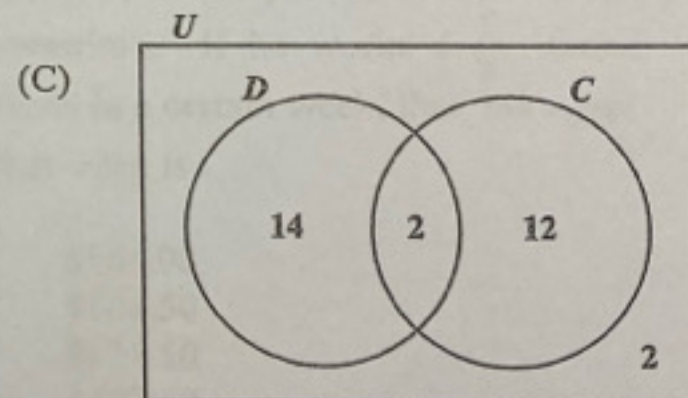
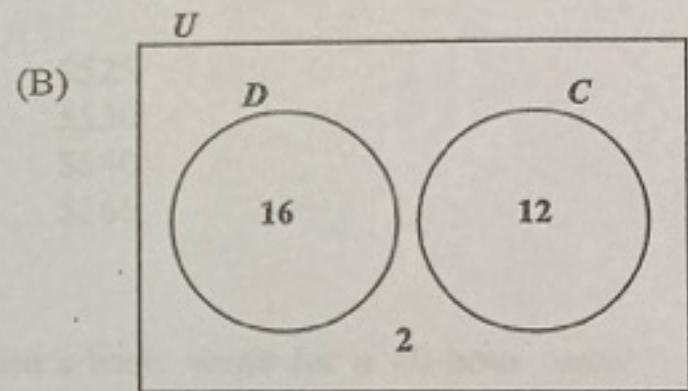
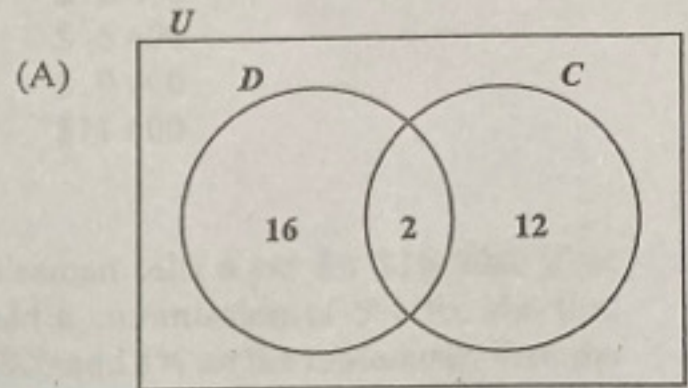
10. In the Venn diagram, X represents the set of factors of 12. Y represents the set of factors of 9. The shaded region represents the set of all factors of

- (A) 3
- (B) 6
- (C) 21
- (D) 108

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

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

12. The 30 students in Teacher May's class have either a dog (D) or a cat (C), or none of the two. ALL the students who have a cat also have a dog. If $n(C) = 12$ and $n(D) = 16$, which of the following Venn diagrams correctly represents this information?



13. Excluding sales tax, how much will be saved when a video which costs \$12.00 is sold at a 20% discount?

- (A) \$0.24
- (B) \$1.20
- (C) \$2.40
- (D) \$3.60

14. If EC\$2.50 is equivalent to US\$1.00, then EC\$20.00 in US dollars is

- (A) \$ 5.00
- (B) \$ 8.00
- (C) \$50.00
- (D) \$80.00

15. The cash price of a television set is \$350. When bought on hire purchase, a deposit of \$35 is required, followed by 12 monthly payments of \$30. How much is saved by paying cash?

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

16. A company employs 20 persons as gardeners and clerks. The mean daily wage of ALL the employees is \$22.40. If EACH of the 12 gardeners is paid \$26.00 per day, then the daily amount paid to each of the 8 clerks is

- (A) \$ 3.60
- (B) \$12.20
- (C) \$17.00
- (D) \$48.40

17. A man's annual salary is \$45 000. His tax free allowances total \$13 000. He has to pay a tax of 20% on his taxable income.

The tax payable is

- (A) \$ 2 600
- (B) \$ 6 400
- (C) \$ 9 000
- (D) \$11 600

18. A salesman sells a car for \$10 500. If he is paid a commission of 5% for the first \$10 000 and 8% on the remainder, then the TOTAL commission he receives is

- (A) \$525
- (B) \$530
- (C) \$540
- (D) \$565

19. A man's basic wage for a 40-hour week is \$160.00. He is paid \$5.00 per hour for overtime. If he works $6\frac{1}{2}$ hours overtime in a certain week, then his wage for that week is

- (A) \$165.00
- (B) \$166.50
- (C) \$171.50
- (D) \$192.50

20. 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

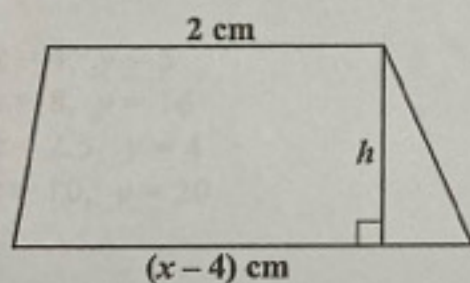
21. Meghan normally saves \$ x each month but in August she saved \$4 less than twice her usual amount. In August, she saved

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

22. If $m * n = \sqrt{m^3 - n^2}$, then $5 * (5 * 2) =$

- (A) 2
 (B) $\sqrt{11}$
 (C) $\sqrt{34}$
 (D) 11

Item 23 refers to the following diagram of a trapezium.



23. The trapezium with height, h , has an area of $x^2 \text{ cm}^2$. The height of the trapezium expressed in terms of x is

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

24. $3 - (x - 2) =$

- (A) $1 - x$
 (B) $x + 5$
 (C) $5 - x$
 (D) $3x + 2$

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 $5(y - 2) = 3(y + 4)$, then y is

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

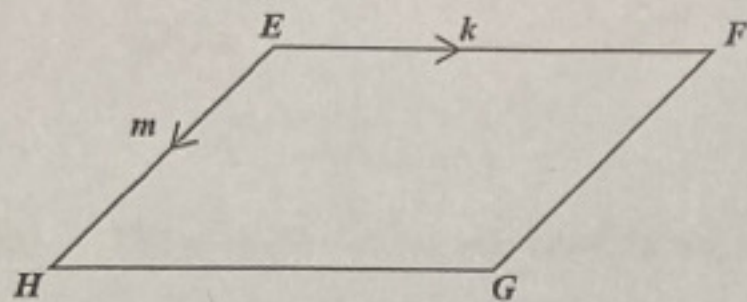
Item 27 refers to the following vectors, \mathbf{p} and \mathbf{q} .

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

27. The vector $\mathbf{p} - 2\mathbf{q}$ is represented by

- (A) $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$
 (B) $\begin{bmatrix} -7 \\ 3 \end{bmatrix}$
 (C) $\begin{bmatrix} 7 \\ -3 \end{bmatrix}$
 (D) $\begin{bmatrix} -1 \\ -3 \end{bmatrix}$

Item 28 refers to the following diagram of a parallelogram, in which EF is parallel to HG , EH is parallel to FG , $\vec{EF} = k$ and $\vec{EH} = m$.



28. \vec{EG} expressed in terms of k and m is

- (A) $k + m$
- (B) $k - m$
- (C) $m - k$
- (D) $-m - k$

29. If $5 \begin{bmatrix} x \\ y \end{bmatrix} = 4 \begin{bmatrix} 10 \\ 20 \end{bmatrix}$, then the values of x and y are

- (A) $x = 4, y = 5$
- (B) $x = 8, y = 16$
- (C) $x = 2.5, y = 4$
- (D) $x = 10, y = 20$

Item 30 refers to the following matrix, A .

$$A = \begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$$

30. The inverse of A , A^{-1} , is given by

(A) $\frac{1}{17} \begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

(B) $\frac{1}{17} \begin{bmatrix} -4 & 1 \\ 7 & -2 \end{bmatrix}$

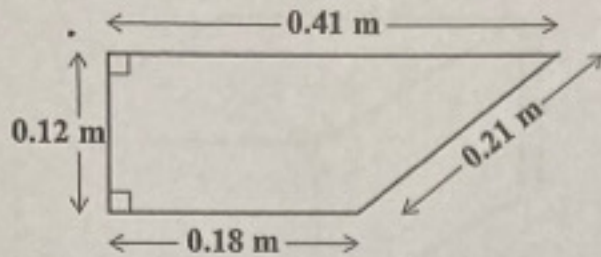
(C) $\begin{bmatrix} -4 & 1 \\ 7 & -2 \end{bmatrix}$

(D) $\begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

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) 1 200

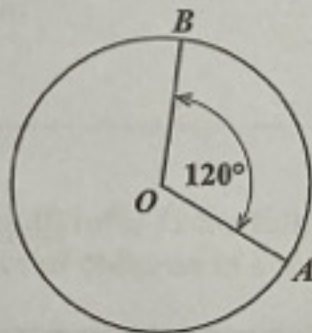
Item 32 refers to the following diagram of a trapezium.



32. The perimeter of the trapezium, in cm, is

- (A) 0.092
- (B) 9.2
- (C) 92
- (D) 920

Item 33 refers to the following circle, with centre O .



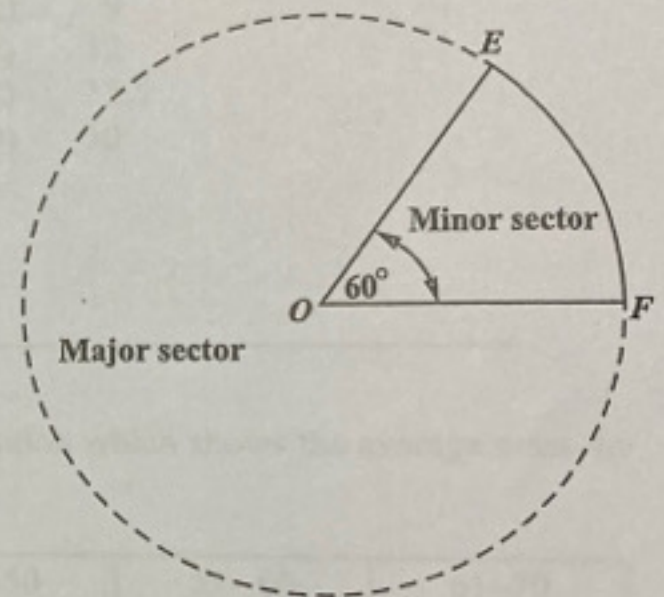
33. If the circumference of the circle is 15 cm, then the length of the minor arc AB , in cm, is

- (A) $\frac{360}{120} \times 15$
- (B) $\frac{120}{360} \times 15$
- (C) $\frac{360}{360 - 120} \times 15$
- (D) $\frac{360 - 120}{360} \times 15$

34. An aircraft leaves A at 16:00 hours and arrives at B at 19:30 hours, travelling at an average speed of 550 kilometres per hour. A and B are in the same time zone. The distance from A to B , in kilometres, is

- (A) 907.5
- (B) 962.5
- (C) 1 815
- (D) 1 925

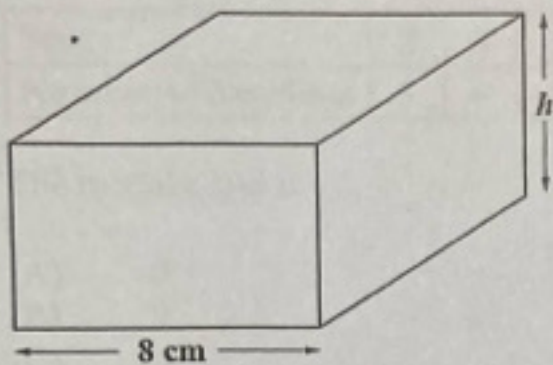
Item 35 refers to the following diagram which shows a circle, with centre O , and the major and minor sectors indicated.



35. If the area of the major sector is 515 cm^2 , then the area of the circle, in cm^2 , is

- (A) 103
- (B) 412
- (C) 575
- (D) 618

Item 36 refers to the following diagram which shows a cuboid.



36. The volume of the cuboid is 320 cm^3 and the height is $h \text{ cm}$. If the length of the square base of the cuboid is 8 cm , what is the value of h ?

- (A) 5 cm
- (B) 16 cm
- (C) 32 cm
- (D) 64 cm

37. The area of a triangle is 60 cm^2 and its height is 10 cm . What is the length of the base of the triangle, in cm?

- (A) 6
- (B) 12
- (C) 13
- (D) 17

38. A square has the same perimeter as a rectangle whose sides are 9 cm and 15 cm in length. What is the length, in cm, of the side of the square?

- (A) 9
- (B) 12
- (C) 12.5
- (D) 50

Items 39 and 40 refer to the following frequency distribution which shows the average mass, in kg, of a group of children in a school.

Mass (kg)	21–30	31–40	41–50	51–60	61–70
Frequency	29	47	24	39	11

39. The lower limit of the median class is

- (A) 31
- (B) 41
- (C) 51
- (D) 61

40. How many children have a mass of at MOST 50 kg ?

- (A) 24
- (B) 50
- (C) 76
- (D) 100

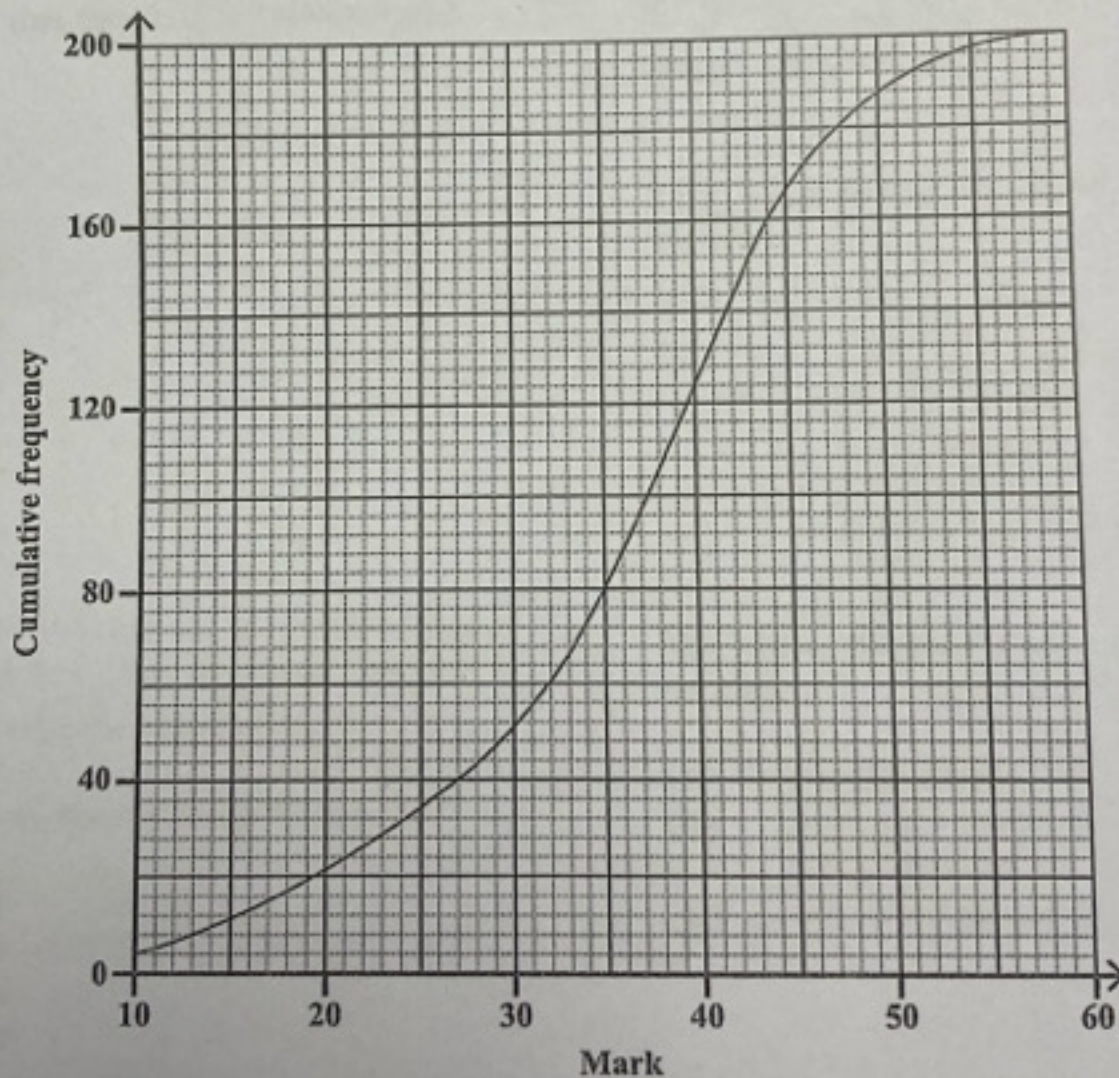
Item 41 refers to the following table which shows the frequency distribution of scores obtained by students on a test.

Score	2	3	5	6	8	11
Number of Students	8	4	6	3	12	2

41. The modal score is

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

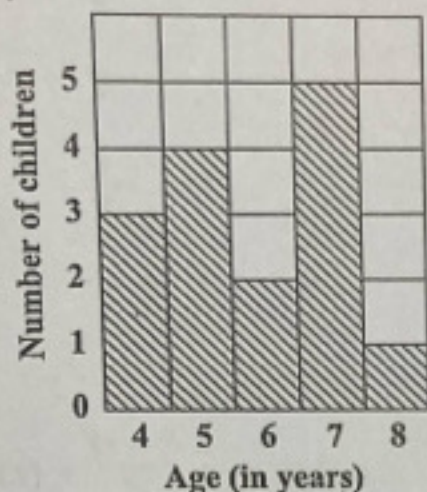
Item 42 refers to the following diagram of a cumulative frequency curve which shows the marks obtained by 200 students on a test.



42. The lower quartile of the marks scored by the 200 students is

- (A) 30.0
- (B) 35.0
- (C) 37.5
- (D) 45.0

Item 43 refers to the following bar chart which shows the ages of children who took part in a survey.



43. A child is selected at random. What is the probability that the child is MORE than 4 years old?

- (A) $\frac{1}{5}$
- (B) $\frac{1}{15}$
- (C) $\frac{13}{15}$
- (D) $\frac{4}{5}$

44. Six hundred students sit an examination. The probability of a randomly selected student passing the examination is $\frac{4}{5}$.

How many students are expected to fail?

- (A) 80
- (B) 100
- (C) 120
- (D) 480

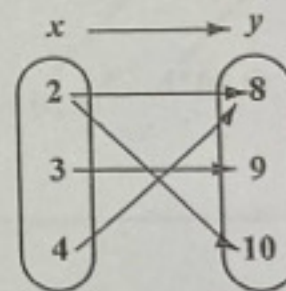
45. Which of the following functions represents the equation of a straight line?

- (A) $y = \frac{4}{x}$
- (B) $y = x^2 - 4$
- (C) $y = 2x + 3$
- (D) $y = x^2 + 2x - 5$

46. The point where a linear function crosses the vertical axis is

- (A) always negative
- (B) always positive
- (C) the x -intercept
- (D) the y -intercept

Item 47 refers to the following arrow diagram.



47. The arrow diagram above describes the relation

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

48. What is the y -intercept of the straight line $2y = -3x - 8$?

- (A) 2
- (B) 3
- (C) $-\frac{3}{2}$
- (D) -4

49. If $h(x) = \frac{3x-2}{5}$, then $h(4) =$

- (A) -4
- (B) $-\frac{14}{5}$
- (C) 2
- (D) $\frac{14}{5}$

50. What is the value of $f^{-1}(1)$, if the function f is given as $f: x \rightarrow 5 - 2x$?

- (A) 1
- (B) 2
- (C) 3
- (D) 7

51. The values of x at the points where $y = 4x - x^2$ intersects the x -axis are

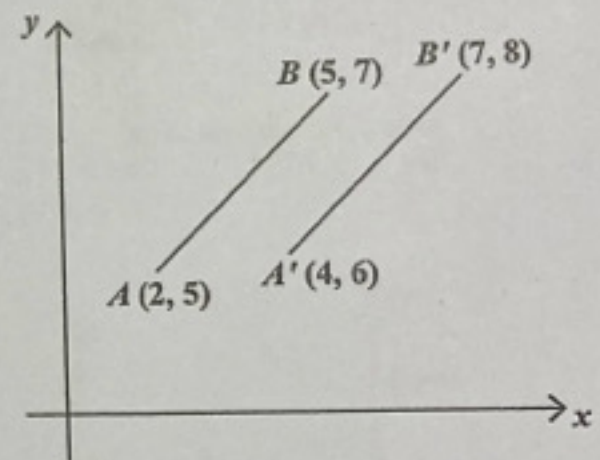
- (A) $x = 0$ and $x = 2$
- (B) $x = 2$ and $x = 4$
- (C) $x = 0$ and $x = 4$
- (D) $x = 0$ and $x = -4$

52. A line L is perpendicular to the line

$y = \frac{2}{5}x - 8$. What is the gradient of the line L ?

- (A) $-\frac{5}{2}$
- (B) $-\frac{2}{5}$
- (C) $\frac{2}{5}$
- (D) 2

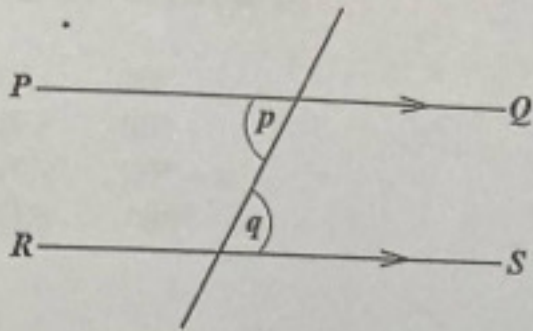
Item 53 refers to the following diagram which shows a translation.



53. 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) $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$

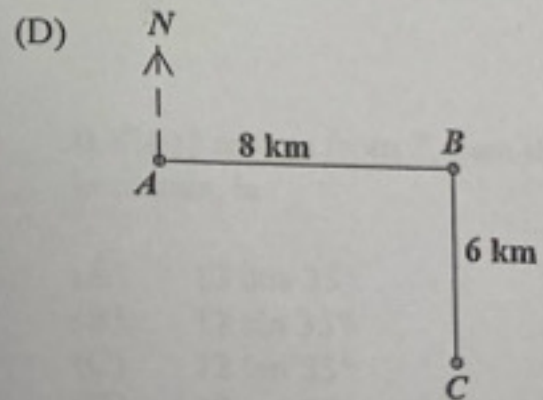
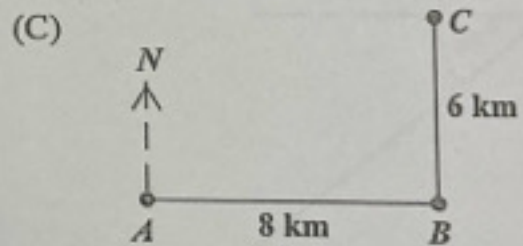
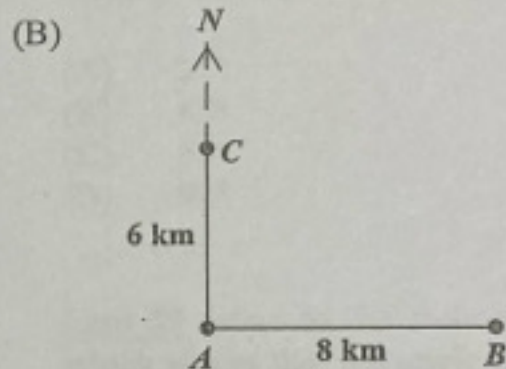
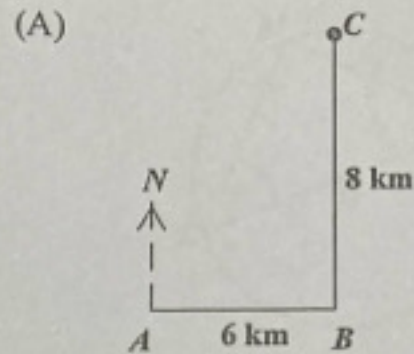
Item 54 refers to the following transversal diagram in which PQ and RS are parallel.



54. Which of the following statements BEST describes the relation between p and q ?

- (A) $p = q$
- (B) $p < q$
- (C) $p + q = 90^\circ$
- (D) $p + q = 180^\circ$

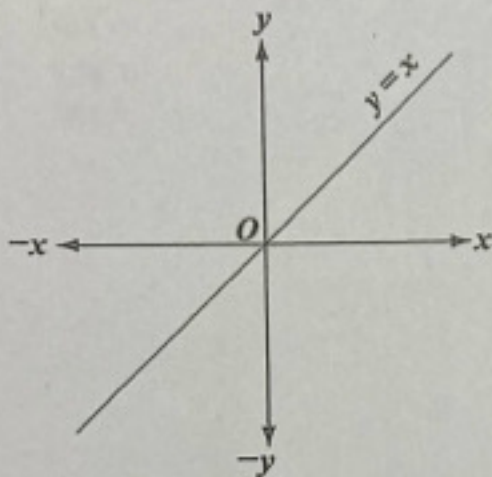
55. A ship sailed 8 km due east from A to B . It then sailed 6 km due north to C . Which of the following diagrams BEST represents the path of the ship?



56. In a polygon, Angle $A = x^\circ$ and Angle A and Angle B are supplementary. What is the size of Angle B ?

- (A) 30°
- (B) 60°
- (C) $90^\circ - x$
- (D) $180^\circ - x$

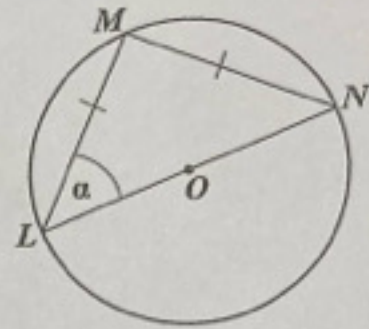
Item 57 refers to the following diagram which shows the graph of the line $y = x$.



57. If the line $y = x$ is rotated anti-clockwise about O through 90° , then its image is

- (A) $y = -x$
- (B) $x = y$
- (C) $x = 0$
- (D) $y = 0$

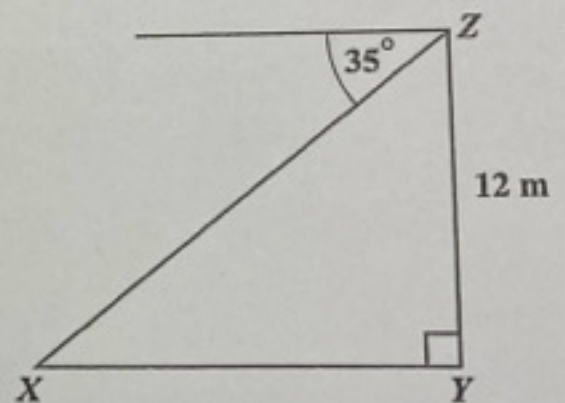
Item 58 refers to the following diagram which shows a triangle within a circle. In the triangle, LM and MN are equal. The circle is centred at O .



58. What is the size of Angle α ?

- (A) 25°
- (B) 45°
- (C) 50°
- (D) 90°

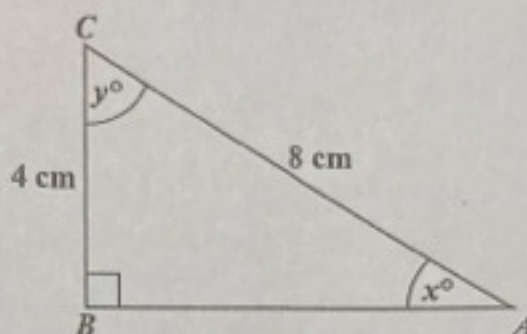
Item 59 refers to the following diagram which shows that the angle of depression of a point X from Z is 35° .



59. If Y is 12 metres from Z , then the base, XY , in metres, is

- (A) $12 \cos 35^\circ$
- (B) $12 \sin 35^\circ$
- (C) $12 \tan 35^\circ$
- (D) $12 \tan 55^\circ$

Item 60 refers to the following right-angled triangle.



60. Which trigonometric ratio is equal to $\frac{4}{8}$?
- (A) $\sin x$
 - (B) $\tan y$
 - (C) $\cos x$
 - (D) $\tan x$

END OF TEST

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