FORM TP 2009091

CANDIDATE – PLEASE NOTE!

You must sign below and return this booklet with the Answer Sheet. Failure to do so may result in disqualification.

Signature

TEST CODE **01234010**

MAY/JUNE 2009

CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE EXAMINATION

MATHEMATICS

Paper 01 – General Proficiency

90 minutes

20 MAY 2009 (p.m.)

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READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 90 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Do not be concerned that the answer sheet provides spaces for more answers than there are items in this test.
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 answer space (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, omit it and go on to the next one. Your score will be the total number of correct answers.
8. **A list of formulae is provided on page 2 of this booklet.**
9. You may do any rough work in the booklet.
10. Calculators and mathematical tables may NOT be used for this paper.

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AFFIX SEAL HERE

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

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LIST OF FORMULAE

Volume of a prism

$V = Ah$ where A is the area of a cross-section and h is the perpendicular length.

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.

Area of a circle

$A = \pi r^2$ where r is the radius of the circle.

Area of trapezium

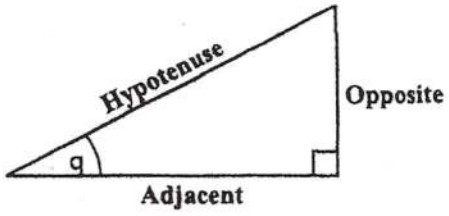
$A = \frac{1}{2}(a + b)\,h$ where a and b are the lengths of the parallel sides and h is the perpendicular distance between the parallel sides.

Roots of quadratic equations

If $ax^2 + bx + c = 0$,

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

Trigonometric ratios



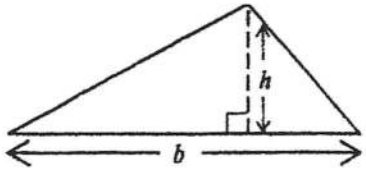
$\sin\theta = \dfrac{\text{opposite side}}{\text{hypotenuse}}$

$\cos\theta = \dfrac{\text{adjacent side}}{\text{hypotenuse}}$

$\tan\theta = \dfrac{\text{opposite side}}{\text{adjacent side}}$

Area of triangle

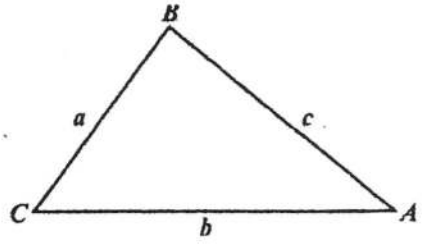
Area of $\Delta = \frac{1}{2}bh$ where b is the length of the base and h is the perpendicular height



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

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

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



Sine rule

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

Cosine rule

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

1. $(-3)^2 + (-2)^2 =$

(A) -13
(B) -10
(C) 13
(D) 25

2. Written in scientific notation, 0.045×10^{-3} is

(A) 4.5×10^{-6}
(B) 4.5×10^{-5}
(C) 4.5×10^{-4}
(D) 4.5×10^{-1}

3. What percentage of 30 is 6?

(A) 5%
(B) 18%
(C) 20%
(D) 150%

4. $11.1 \div 0.01$ is equal to

(A) 110
(B) 111
(C) 1100
(D) 1110

5. If \$560 is shared in the ratio 2 : 3 : 9, then the DIFFERENCE between the largest and the smallest shares is

(A) \$ 80
(B) \$240
(C) \$280
(D) \$360

6. If 60% of a number is 90, what is the number?

(A) 30
(B) 54
(C) 150
(D) 180

7. 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

8. The number 301 can be written as

(A) $3 \times 10^2 + 1$
(B) $3 \times 10^3 + 1$
(C) $3 \times 10^2 + 1 \times 10$
(D) $3 \times 10^3 + 1 \times 10$

9. If $3n$ is an odd number, which of the following is an even number?

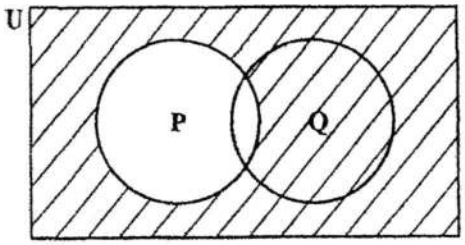
(A) $3n - 2$
(B) $3n + 2$
(C) $3n - 1$
(D) $3n + 2n$

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10. What is the LEAST number of plums that can be shared equally among 6, 9 or 12 children?

(A) 27
(B) 36
(C) 54
(D) 72

Item 11 refers to the Venn diagram below.



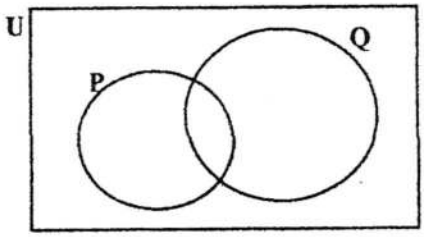
11. In the Venn diagram, the shaded area represents

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

12. Which of the following sets is equivalent to {a, b, c, d}?

(A) { 4 }
(B) {a, b, c}
(C) {p, q, r, s}
(D) {1, 2, 3, 4, 5}

Item 13 refers to the Venn diagram below.

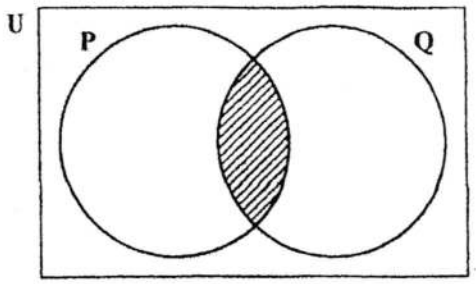


13. In the Venn diagram, $n(P) = 5$, $n(Q) = 9$ and $n(P \cup Q) = 10$.

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

(A) 4
(B) 6
(C) 14
(D) 24

Item 14 refers to the Venn diagram below.



14. In the Venn diagram, if P = {Factors of 6} and Q = {Factors of 4}, then the shaded region represents

(A) { }
(B) {1, 2}
(C) {4, 6, 8, ...}
(D) {12, 24, 36, ...}

15. The simple interest on \$400 at 5% per annum for 2 years is

(A) $\$\frac{400 \times 5 \times 2}{100}$

(B) $\$\frac{400 \times 5}{2 \times 100}$

(C) $\$\frac{400 \times 2}{5 \times 100}$

(D) $\$\frac{400 \times 100}{2 \times 5}$

16. If p sweets cost q cents, then the cost of one sweet is

(A) pq cents

(B) $(q - p)$ cents

(C) $\frac{p}{q}$ cents

(D) $\frac{q}{p}$ cents

17. During a sale, a shop allows 20% discount off the marked price of clothing. What will a customer pay for a dress with a marked price of $30?

(A) $10
(B) $20
(C) $24
(D) $30

18. Tom bought a pen for $60 and sold it to gain 20% on his cost price. How much money did he gain?

(A) $12
(B) $40
(C) $72
(D) $80

19. Susan bought a calculator for $120. She had to pay a sales tax of 10% on the price. How much change would she receive from $140?

(A) $ 8.00
(B) $12.00
(C) $28.00
(D) $32.00

20. Mary invested $200 for 3 years at 5% per annum. John invested $300 at the same rate. If they both received the same amount of money in interest, for how many years did John invest his money?

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

(B) 2

(C) 3

(D) 10

21. A company employs 12 gardeners at $26 per day, and 8 clerks at $17 per day. What is the mean daily wage, in dollars, of the 20 employees?

(A) $20.00
(B) $21.50
(C) $22.40
(D) $31.50

22. If the simple interest on $800 for 3 years is $54, what is the rate of interest per annum?

(A) $\frac{4}{9}\%$

(B) $2\frac{1}{4}\%$

(C) 5%

(D) 44%

23. $-2(x-4) =$

(A) $-2x+8$
(B) $-2x+4$
(C) $-2x-4$
(D) $-2x-8$

24. $(8a)^2 =$

(A) $16a$
(B) $64a$
(C) $16a^2$
(D) $64a^2$

25. Given that $a \Delta b = 2a - 3b$ then $2 \Delta (-3) =$

(A) -7
(B) -5
(C) 3
(D) 13

26. If $20a - 16 = 12(3 - a)$, then $a =$

(A) $\frac{5}{8}$

(B) $\frac{21}{16}$

(C) $\frac{13}{8}$

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

27. $P = \frac{m^2}{2 - m}$. When $m = -3$, the value of P is

(A) -6

(B) $\frac{-6}{5}$

(C) $\frac{9}{5}$

(D) 9

28. $2(a^2b)^3 =$

(A) $2a^5b^3$
(B) $2a^6b^3$
(C) $6a^2b$
(D) $8a^6b^3$

29. For all of a and b,
$3a(a + 2b) - b(2a - 3b) \equiv$

(A) $3a^2 - ab + 3b^2$
(B) $3a^2 + 4ab + 3b^2$
(C) $3a^2 + 4ab - 3b^2$
(D) $3a^2 + 8ab - 3b^2$

30. Which of the following represents the statement "The difference of two square numbers is positive"?

(A) $x^2 - y^2 > 0$
(B) $2x - 2y > 0$
(C) $(y - x)^2 > 0$
(D) $2(y - x) > 0$

31. John has x marbles and Max has twice as many. Max gives John 5 of his marbles. How many marbles does Max now have?

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

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

(A) $30\ cm^3$
(B) $100\ cm^3$
(C) $300\ cm^3$
(D) $1000\ cm^3$

33. How many kilograms are there in one tonne?

(A) 10
(B) 100
(C) 1 000
(D) 10000

34. On leaving Trinidad, the time on a pilot's watch was 23:00 hrs. When he arrived at his destination, in the same time zone, on the following day his watch showed 03:00 hrs. How many hours did the flight take?

(A) 4
(B) 20
(C) 26
(D) 52

35. The circumference of a circle is 132 cm. Given that $\pi = \frac{22}{7}$, the radius of the circle, in centimetres, is

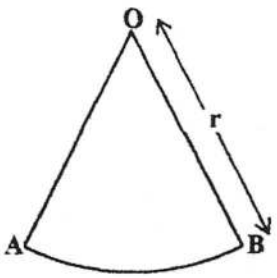
(A) 42

(B) 21

(C) $\sqrt{42}$

(D) $\sqrt{21}$

Item 36 refers to the diagram below.



36. AOB is a sector of a circle such that angle $AOB = 60°$ and OB is r units long. The area of AOB is

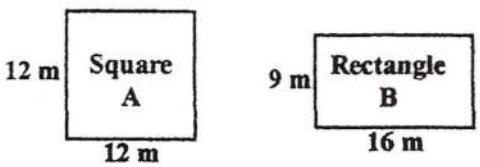
(A) $\frac{1}{3}\pi r$

(B) $\frac{1}{6}\pi r$

(C) $\frac{1}{3}\pi r^2$

(D) $\frac{1}{6}\pi r^2$

Item 37 refers to the diagrams below.



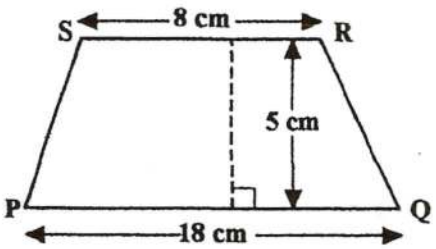
37. Which of the following statements is true about the perimeters of the figures A and B?

(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

38. The area of a rectangle is 53.6 cm². If the length is multiplied by four and the width is halved, the area would then be

(A) 26.8 cm²
(B) 53.6 cm²
(C) 107.2 cm²
(D) 214.4 cm²

Item 39 refers to the diagram below.



39. The area of the trapezium above is

(A) 45 cm²
(B) 65 cm²
(C) 90 cm²
(D) 130 cm²

40. The marks obtained by ten students in a test marked out of 25 were:

14, 22, 15, 19, 19, 16, 24, 13, 20, 19

The range of marks was

(A) 11
(B) 13
(C) 18
(D) 19

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Item **41** refers to the following table.

10	15	4	7
8	8	1	4

41. The median of the eight scores in the table is

(A) 4
(B) 7.25
(C) 7.50
(D) 8

42. A bag contains 2 red, 4 yellow and 6 blue balls. The probability of drawing a **blue** ball from the bag at random is

(A) $\frac{1}{6}$

(B) $\frac{1}{3}$

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

(D) $\frac{6}{11}$

Item **43** refers to the following table.

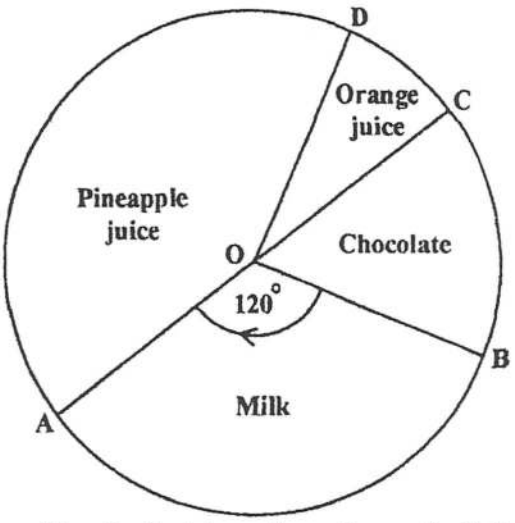
Length of Leaf (cm)	10 - 14	15 – 19	20 – 24	25 - 29
Frequency	3	8	12	7

43. The lengths of 30 cabbage leaves were measured, to the nearest cm, and the information grouped as shown in the table above.

The class boundaries are

(A) 3, 8, 12, 7
(B) 5, 5, 5, 5
(C) 10, 14, 15, 19, 20, 24, 25, 29
(D) 9.5, 14.5, 19.5, 24.5, 29.5

Item **44** refers to the following pie-chart. O is the centre of the circle and AOC is the diameter.



44. The pie-chart shows the preference in drinks of a group of students. If 12 students prefer chocolate, then the total number of students is

(A) 48
(B) 72
(C) 180
(D) 360

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

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

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

(A) $y = \frac{4}{x}$

(B) $y = 2x + 3$

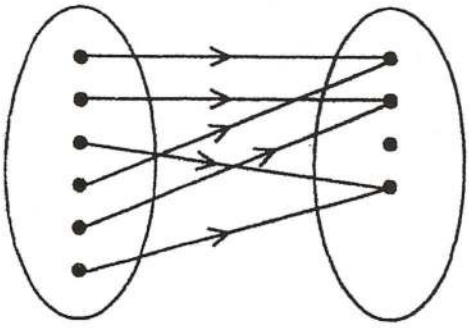
(C) $y = x^2 - 4$

(D) $y = x^2 + 2x - 5$

47. If $f(x) = x^2 - x - 1$, then $f(-5) =$

(A) –31
(B) 24
(C) 29
(D) 31

Item 48 refers to the diagram below.

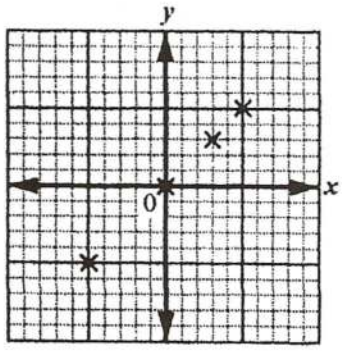


48. The relationship that BEST describes the mapping in the above diagram is

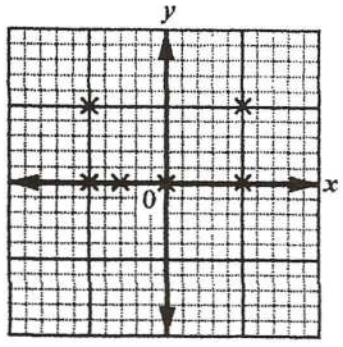
(A) one-to-one
(B) one-to-many
(C) many-to-one
(D) many-to-many

49. Which of the following represents the graph of a function?

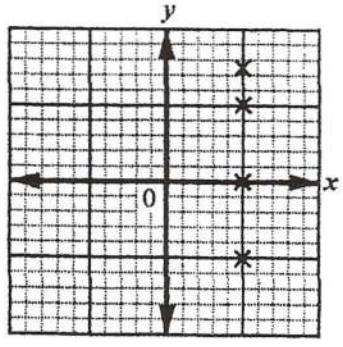
(A)



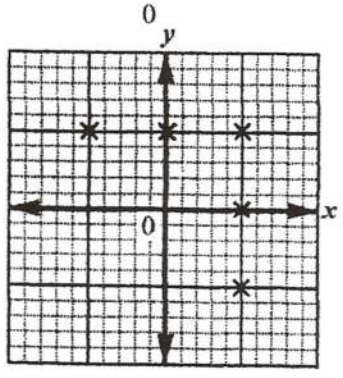
(B)



(C)



(D)



50. Which of the following sets is represented by the relation $f: x \to x^2 + 3$?

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

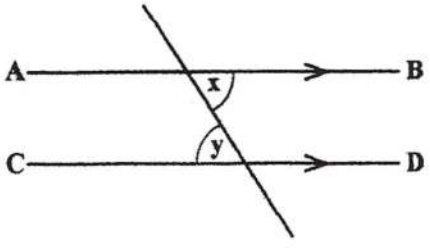
51. The range of $f: x \to x^3$ for the domain $\{-2,-1,0,1,2\}$ is

(A) $\{0,1,8\}$
(B) $\{-2,-1,0,1,2\}$
(C) $\{-6,-3,0,3,6\}$
(D) $\{-8,-1,0,1,8\}$

52. A boat was travelling on a bearing of 270°. In what direction was it travelling?

(A) West
(B) East
(C) North
(D) South

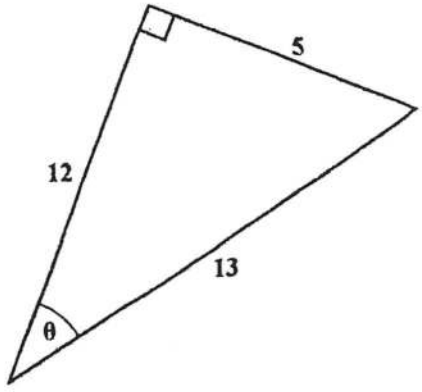
Item **53** refers to the following diagram.



53. In the diagram AB and CD are parallel. Which of the following BEST describes the relation between x and y?

(A) $x + y < 2x$
(B) $x = y$
(C) $x + y > 2x$
(D) $x > y$

Item **54** refers to the following diagram.



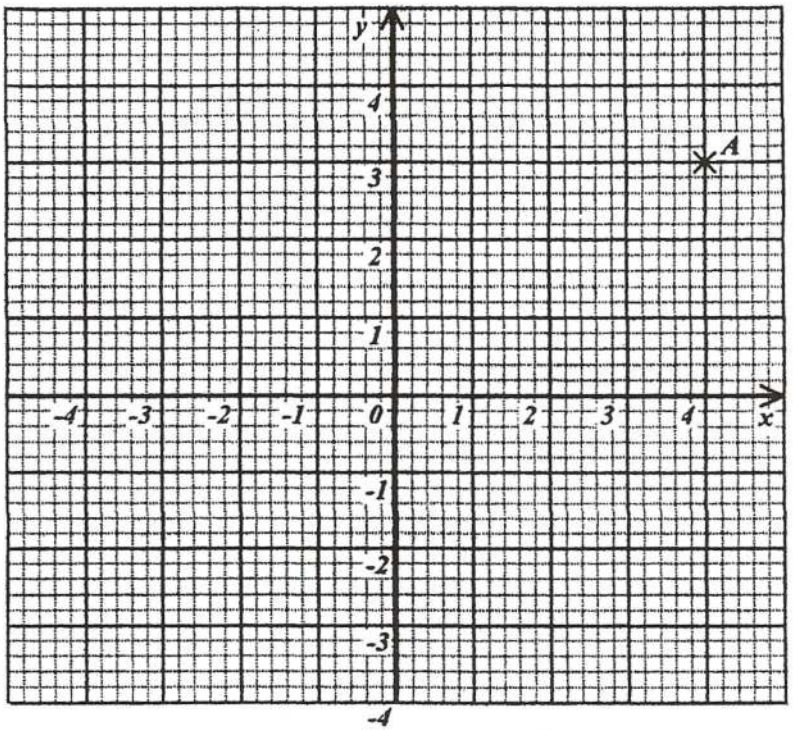
54. In the right-angled triangle, $\tan\theta$ is

(A) $\frac{5}{13}$
(B) $\frac{5}{12}$
(C) $\frac{12}{5}$
(D) $\frac{13}{5}$

55. The image of a point $P(-2, 3)$ under a translation $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ is

(A) (-6, 12)
(B) (-5, -1)
(C) (5, 1)
(D) (1, 7)

Item 56 refers to the following diagram.

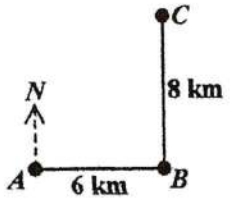


56. The point A is shown on the diagram above. What are the coordinates of the image of A under reflection in the y-axis?

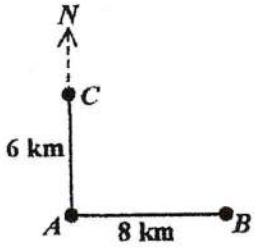
(A) (-4, 3)
(B) (4, -3)
(C) (3, -4)
(D) (-3, 4)

57. A ship sailed 8 km due east from A to B. It then sailed 6 km due north to C. Which diagram below BEST represents the path of the ship?

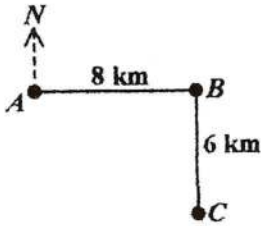
(A)



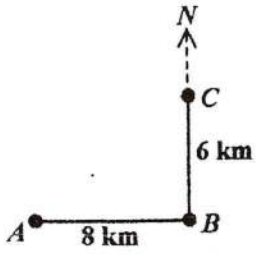
(B)



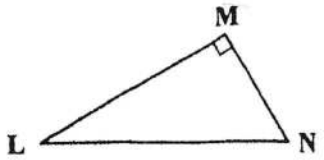
(C)



(D)

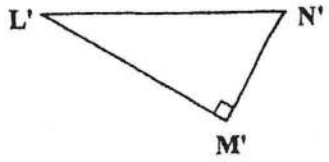


Item **58** refers to the triangle below.

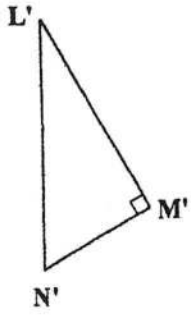


58. The triangle *LMN* is rotated in a clockwise direction about *L* through an angle of 90°. What is its image?

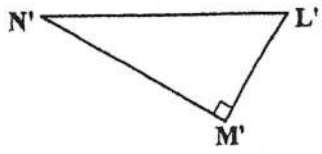
(A)



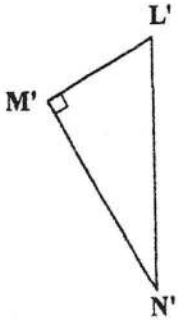
(B)



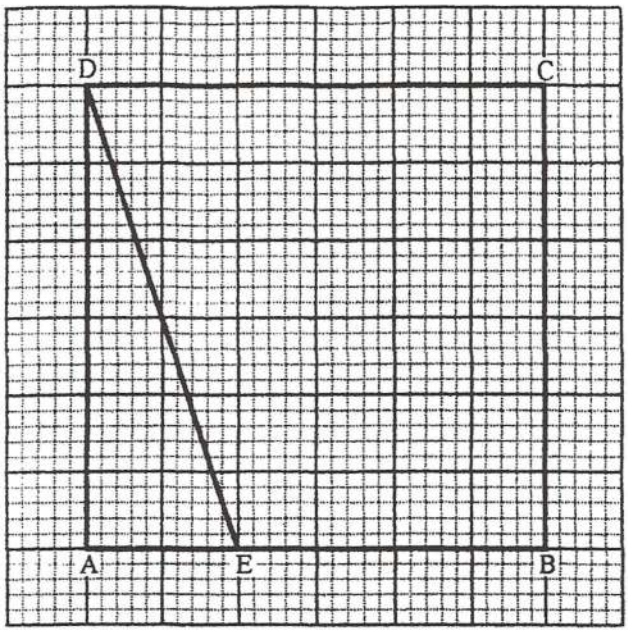
(C)



(D)



Item 59 refers to the following diagram.

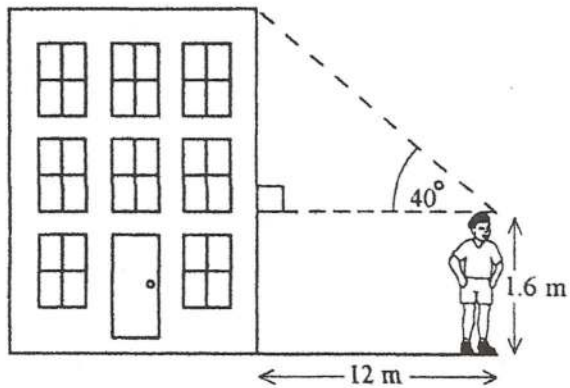


59. How many triangles congruent to ΔADE would be needed to cover the rectangle $ABCD$ entirely?

(A) 2
(B) 4
(C) 6
(D) 8

Item 60 refers to the diagram of a building below.

A boy stands 12 metres from the foot of the building and observes the angle of elevation of the top of the building.



60. The height of the building is approximately

(A) $12 \tan 40°$
(B) $1.6 + 12 \sin 40°$
(C) $1.6 + 12 \cos 40°$
(D) $1.6 + 12 \tan 40°$

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

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