basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2022 GRADE 9 PILOT STUDY

Subject: Mathematics

Marks: 75

Duration: 90 Minutes

This test consists of 29 pages, excluding the cover page.

Instructions to the learner

1. Read all the instructions and questions carefully.
2. Answer all questions.
3. Use the provided answer book to write all your answers.
4. Do the necessary calculations before choosing the correct answer in Section A.
5. Non-programmable scientific calculators may be used, unless stated otherwise.
6. Diagrams are not necessarily drawn to scale; all lines are regarded as straight lines unless stated otherwise.

The test starts on the next page.



Do not turn the page until you are told to do so.

SECTION A

1. What kind of a number is $\sqrt{5}$?

   A A natural number
   B A whole number
   C A rational number
   D An irrational number (1)

2. What is the LCM of 14 and 16?

   A 224
   B 112
   C 4
   D 2 (1)

A car travels 180 km in 2 hours on a straight road.

3. How many km can the car travel in 210 minutes at the same speed?

   A 630 km
   B 25,7 km
   C 102,9 km
   D 315 km (1)

$3[-(-3+17)] - (-4) \times 2$

4. Which of the following is the correct answer?

   A 50
   B 46
   C -40
   D -34 (1)

$a = 2$ and $b = 3$

5. What is the value of $\frac{3(-2a \times b)+6a^2b^2}{ab}$?

A 18

B 30

C 42

D 48 (1)

$$\frac{(-4)^3}{\sqrt{4} \times \sqrt[3]{8}} + \frac{\sqrt{64}}{2} - (2^2)$$

6. What is the value in simplest form of the expression?

A -16

B 16

C -3

D 3 (1)

$4a^{12} \div 4a^3$

7. What is the answer in simplest form of the expression?

A a^4

B a^9

C a^{15}

D a^{36} (1)

$$\frac{5^{-1}+6^{-1}}{5^{-1}\times 6^{-1}}$$

8. What is the answer in simplest form?

A $\frac{60}{11}$

B $\frac{11}{30}$

C 2

D 11 (1)

$$[2(x^2 \times x^3)^2]^3$$

9. What is the answer in simplest form?

A $2x^{10}$

B $4x^{15}$

C $6x^{36}$

D $8x^{30}$ (1)

$$(25)^0 - (5)^0 + 5^4 \times 5^2 \div (5^3)^2$$

10. What is the answer in simplest form?

A 1

B 5

C 21

D 45 (1)

Figure 1

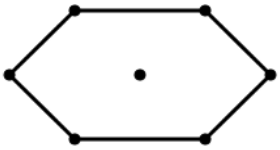


Figure 2

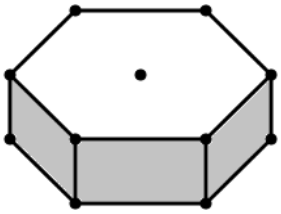
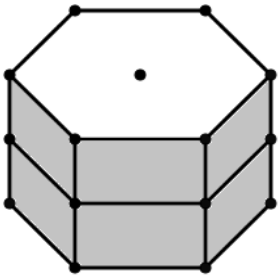


Figure 3



11. How many dots will be in the next hexagonal prism?

A 19

B 24

C 25

D 28 (1)

a ; 4 ; 1 ; $\frac{1}{4}$; b ; ...

12. What are the values of a and b?

A $a = 8$ and $b = \frac{1}{8}$

B $a = 16$ and $b = \frac{1}{8}$

C $a = 16$ and $b = \frac{1}{16}$

D $a = 4$ and $b = \frac{1}{4}$ (1)

Arrangement 1 Arrangement 2 Arrangement 3



Tables and chairs are arranged such that in every second arrangement the tables are not joined together.

The arrangements indicate the number of people that can occupy the tables and chairs.

13. What is the rule to determine the number of people for the 7^{th} arrangement?

A $7n$

B $4n$

C $12n$

D $16n$ (1)

In a soccer match, a referee, two linesmen and 2 captains shake hands before the start of the game.

14. How many handshakes will there be in total?

A 10 handshakes

B 4 handshakes

C 5 handshakes

D 20 handshakes (1)

$(x^4 + x^3 - x^2) \div 4$

15. What is the coefficient of x^2?

A 1

B -1

C $-\frac{1}{4}$

D $\frac{1}{4}$ (1)

$4ax^2 + 3axy - 14ax + 7xay + x^2$

16. Which of the following are like terms in the expression?

A $4ax^2 + x^2$

B $3axy - 14ax$

C $7xay - 14ax$

D $7xay + 3axy$ (1)

$(2x - 3y)(x + 5y)$

17. What is the product?

A $2x^2 + 7xy - 15y^2$

B $2x^2 - 7xy - 15y^2$

C $2x^2 + 17xy + 15y^2$

D $2x^2 - 17xy + 15y^2$ (1)

$$\frac{16x^3 - 2x\,(-3x - x)}{-2x^2}$$

18. What is the expression in its simplest form?

A $8x + 4$

B $8x - 4$

C $-8x + 4$

D $-8x - 4$ (1)

$1 - 9a^2$

19. What are the factors of the expression?

A $(1 - 3a)(1 - 3a)$

B $(1 - 3a)(1 + 3a)$

C $(1 - 9a)(1 - 9a)$

D $(1 - 9a)(1 + 9a)$ (1)

$3x^3 + 9x^2 - 30x$

20. What are the factors of the expression?

A $x(x-5)(x+2)$

B $x(x+5)(x-2)$

C $3x(x-5)(x+2)$

D $3x(x+5)(x-2)$ (1)

The area of a rectangle is $x^2 - x - 2$

21. What is the length (L) and width (W) of the rectangle in terms of x?

A L $= (x+2)$ and W $= (x+1)$

B L $= (x+2)$ and W $= (x-1)$

C L $= (x-1)$ and W $= (x-2)$

D L $= (x+1)$ and W $= (x-2)$ (1)

$\frac{6x^2+18x-60}{48x} \div \frac{x^2-4}{8x}$

22. What is the simplest form of the expression?

A $\frac{x+2}{x+5}$

B $\frac{x-2}{x-5}$

C $\frac{x+5}{x+2}$

D $\frac{x-5}{x-2}$ (1)

$15s^4 - 15z^4$

23. What are the factors if the expression is factorized fully?

A $15(s^4 - z^4)$

B $15(s^2 - z^2)(s^2 + z^2)$

C $15(s - z)(s + z)(s^2 + z^2)$

D $15(s - z)(s + z)(s + z)(s + z)$ (1)

$x - 5 = -7$

24. What is the value of x?

A 2

B 12

C -2

D -14 (1)

$\frac{3x + 1}{2} = 5$

25. What is the value of x?

A -4

B 4

C -3

D 3 (1)

$x(x - 4) = 0$

26. What is the solution of the equation?

A $x = -4$ or $x = 0$

B $x = 0$ or $x = 4$

C $x = 0$

D $x = -4$ (1)

$6^{x-1} = 36$

27. What is the value of x?

A 2

B 3

C -1

D -3 (1)

$y = 12x - 18$ and $y = -6$

28. What is the value of x?

A -1

B 1

C 2

D -2 (1)

x	-1	0	1	2	3	4
y	a	2	3	6	11	18

29. What is the value of a?

A 3

B 1

C -2

D -3 (1)

$18x^2 - 24x = 0$

30. What is the solution of the equation?

A $x = 0$ or $x = \frac{3}{4}$

B $x = 0$ or $x = -\frac{4}{3}$

C $x = 0$ or $x = -\frac{3}{4}$

D $x = 0$ or $x = \frac{4}{3}$ (1)

$4x^2 - 4x = 48$

31. What is the solution of the equation?

A $x = -2$ or $x = 6$

B $x = 3$ or $x = -4$

C $x = 2$ or $x = -6$

D $x = -3$ or $x = 4$ (1)

The diagonal of a rectangle is 9 cm more than its width.

The length of a rectangle is 7 cm more than its width.

32. What is the area of the rectangle?

A 120 cm²

B 130 cm²

C 63 cm²

D 56 cm² (1)



33. What is the rule for the flow diagram?

A $y = x - 1$

B $y = -x - 1$

C $y = 2x - 4$

D $y = -2x - 4$ (1)

$3y = -x - 3$

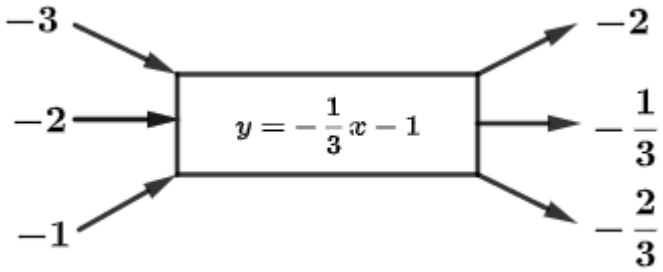
34. Which of the following representations is true for the given function?

A $y = \frac{1}{3}x - 1$

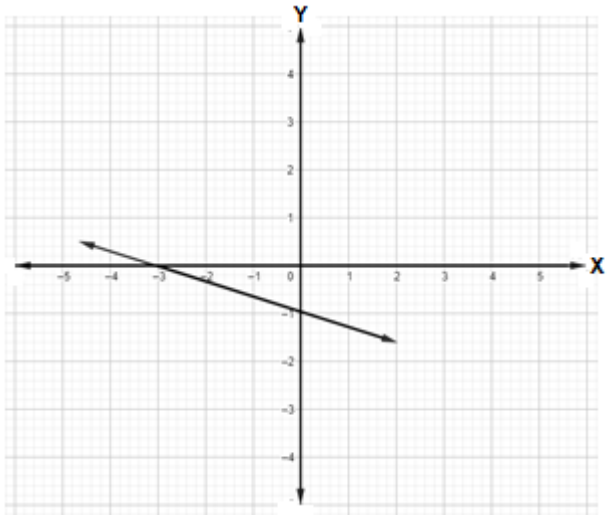
B

x	-3	-2	-1	0
y	0	$\frac{1}{2}$	$\frac{2}{3}$	-1

C



D



(1)

x	1	2	3	7	z
y	3	6	11	51	258

35. What is the value of z?

A 64

B 32

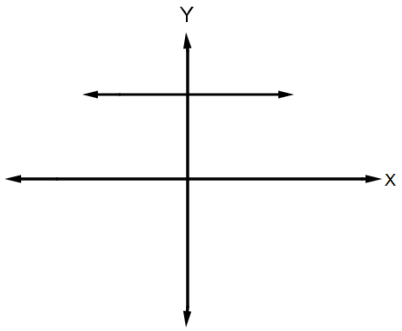
C 16

D 8 (1)

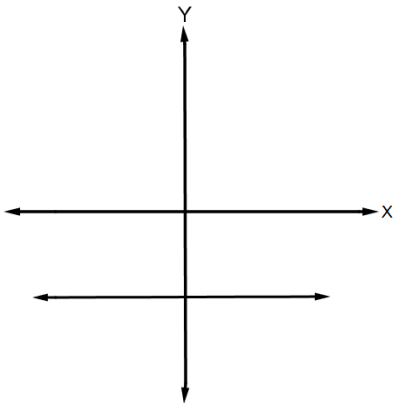
x	-2	-1	0	1	2
y	4	4	4	4	4

36. Which graph represents the line that is represented in the table above?

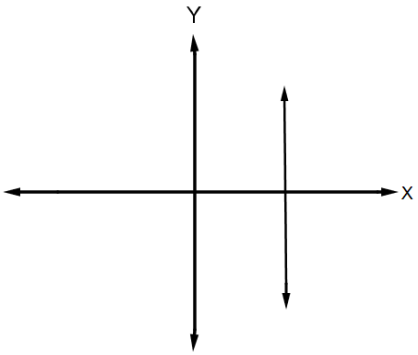
A



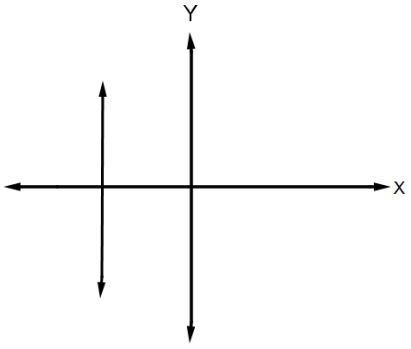
B



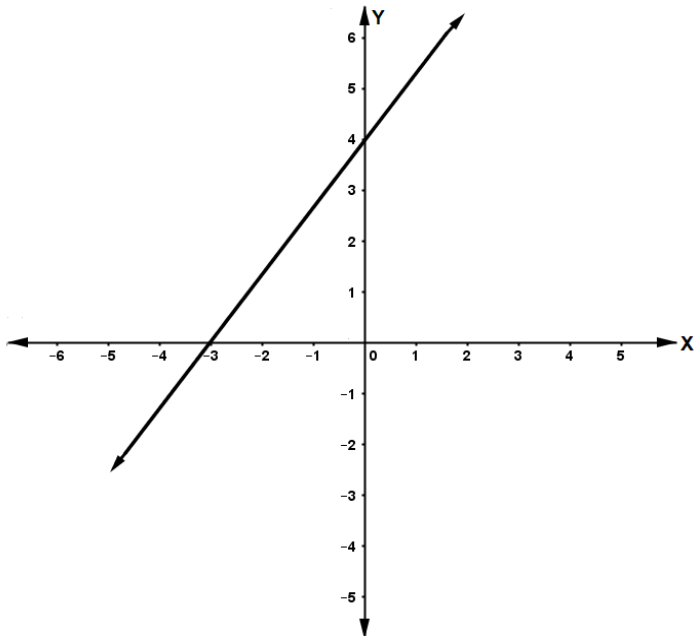
C



D



(1)



37. Which of the following ordered pairs represents the graph?

A

x	-2	-1	0	1	2
y	$\frac{20}{3}$	$\frac{16}{3}$	4	$\frac{8}{3}$	$\frac{4}{3}$

B

x	-2	-1	0	1	2
y	$-\frac{20}{3}$	$-\frac{16}{3}$	-4	$-\frac{8}{3}$	$-\frac{4}{3}$

C

x	-2	-1	0	1	2
y	$\frac{4}{3}$	$\frac{8}{3}$	4	$\frac{16}{3}$	$\frac{20}{3}$

D

x	-2	-1	0	1	2
y	$-\frac{4}{3}$	$-\frac{8}{3}$	-4	$-\frac{16}{3}$	$-\frac{20}{3}$

(1)

Line AB is defined by $2x - y = 8$.

38. What is the equation of the line passing through point $(-2\ ;\ 4)$ and perpendicular to the line AB?

A $y = \frac{1}{2}x + 5$

B $y = 2x + 8$

C $y = 2x - 8$

D $y = -\frac{1}{2}x + 3$ (1)

39. What are the co-ordinates of the image of $A(-3\ ;\ 5)$, reflected in the X–axis?

A $A'(3\ ;\ 5)$

B $A'(-3\ ;\ -5)$

C $A'(-5\ ;\ -3)$

D $A'(5\ ;\ 3)$ (1)

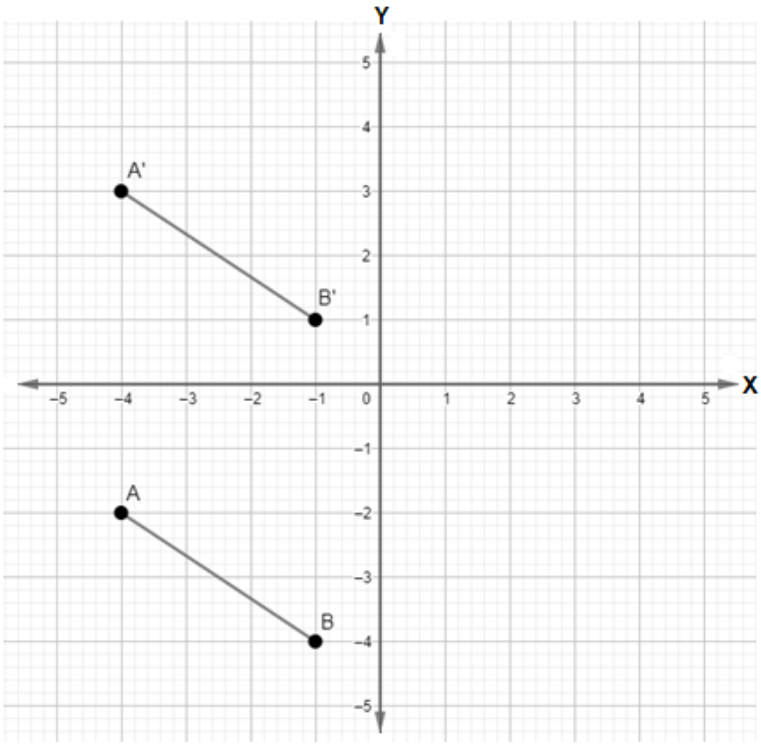
40. What is the rule which maps $\mathrm{K}\ (2\ ;\ 5) \longrightarrow \mathrm{K}'\ (-2\ ;\ 5)$?

A $(x\ ;\ y) \longrightarrow (-x\ ;\ y)$

B $(x\ ;\ y) \longrightarrow (x - 2\ ;\ y)$

C $(x\ ;\ y) \longrightarrow (x + 2\ ;\ y)$

D $(x\ ;\ y) \longrightarrow (x\ ;\ -y)$ (1)



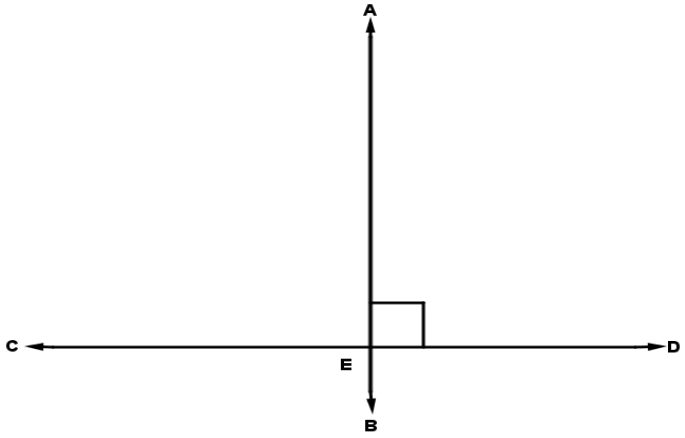
41. Which statement describes the transformation of line segment AB?

A Translated 5 units up.

B Reflected in the X – axis.

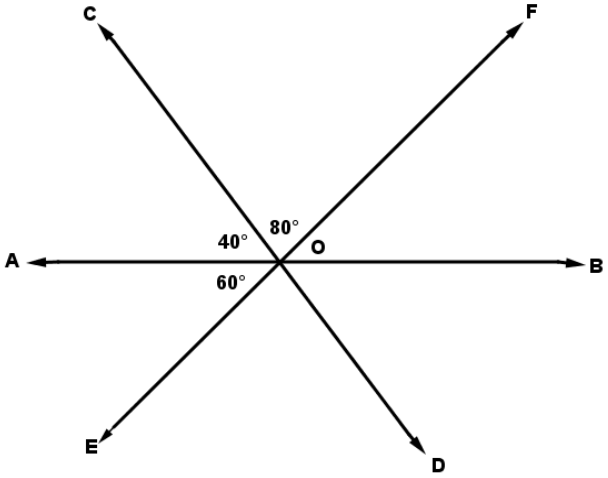
C Translated 5 units down.

D Reflected in the Y – axis. (1)



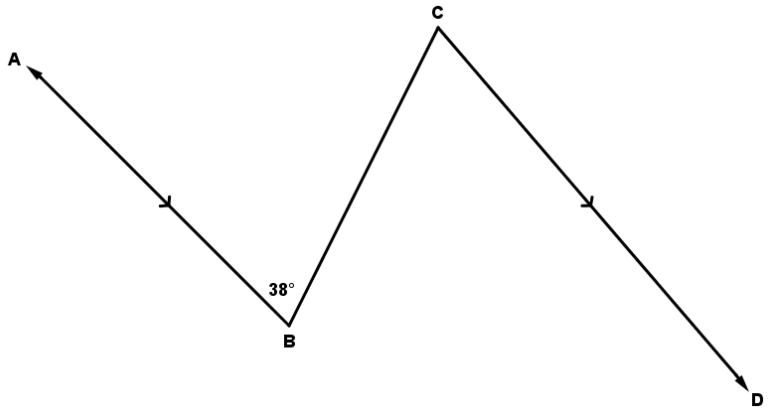
42. What is the size of $A\hat{E}C$?

A 60°
B 90°
C 180°
D 360° (1)



43. What is the size of the angle that is vertically opposite to $E\hat{O}D$?

A 80°
B 60°
C 50°
D 40° (1)



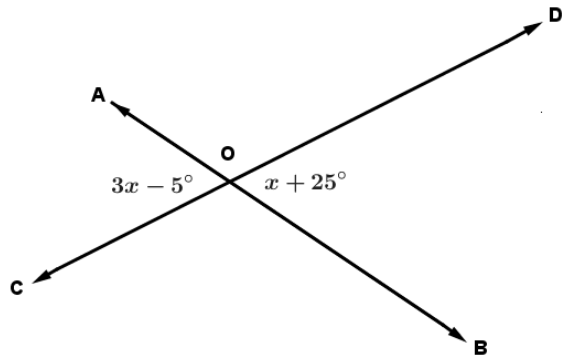
44. Why is $\hat{C} = 38°$?

A Alternate angles AB∥CD

B Corresponding angles AB∥CD

C Supplementary angles

D Vertically opposite angles (1)



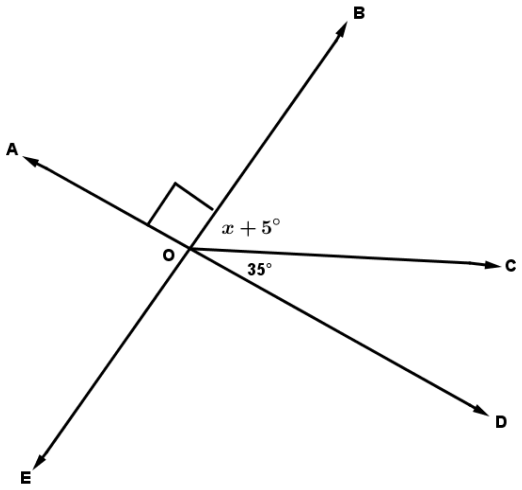
45. What is the size of $A\hat{O}C$?

A $15°$

B $25°$

C $30°$

D $40°$ (1)



46. What is the value of x?

A $85°$

B $55°$

C $30°$

D $50°$ (1)

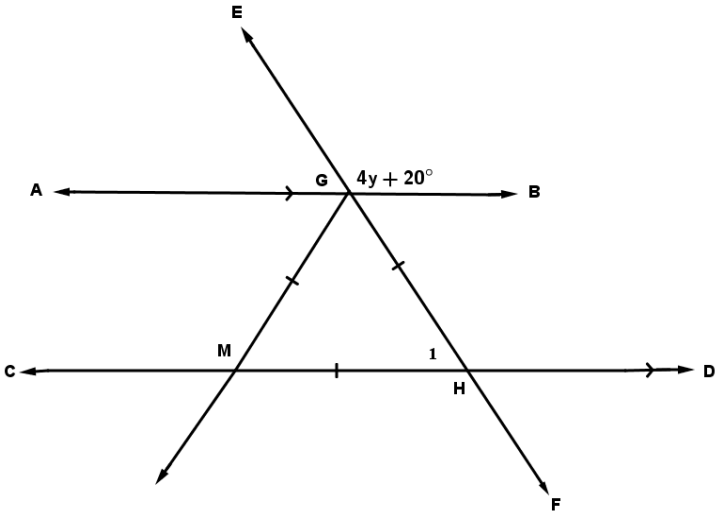
47. Which statement best describes an isosceles triangle?

A One angle is 90^0.

B One angle is greater than 90^0.

C Two sides and two angles are equal.

D Two angles opposite equal sides are equal. (1)



AB∥CD. ΔGMH is an equilateral Δ.

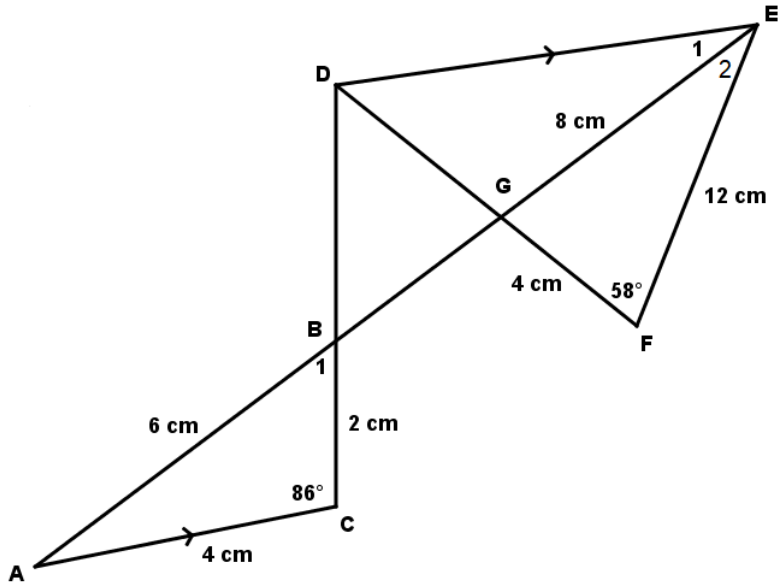
48. What is the value of y?

A $25°$

B $20°$

C $60°$

D $35°$ (1)



AC∥DE, $\hat{F} = 58°, \hat{C} = 86°$, GE = 8 cm, EF = 12 cm, FG = 4 cm, AC = 4 cm, AB = 6 cm and BC = 2 cm.

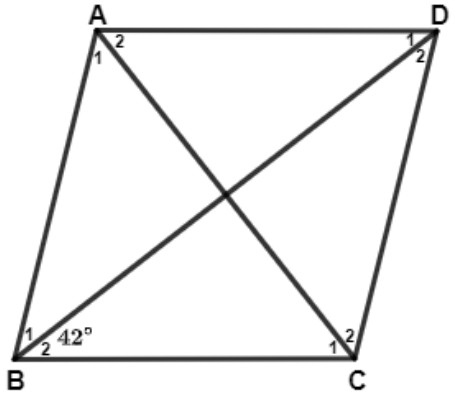
49. What is the size of $\hat{E}_1$?

A $36°$

B $58°$

C $86°$

D $22°$ (1)



ABCD is a rhombus, $\widehat{B}_2 = 42^0$

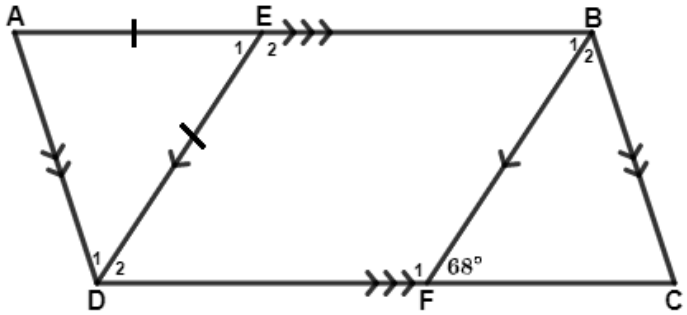
50. What is the size of $A\widehat{C}D$?

A 21^0

B 42^0

C 48^0

D 96^0 (1)



ABCD is a parallelogram with ED∥BF, AE=ED and $\widehat{F}_2 = 68^0$.

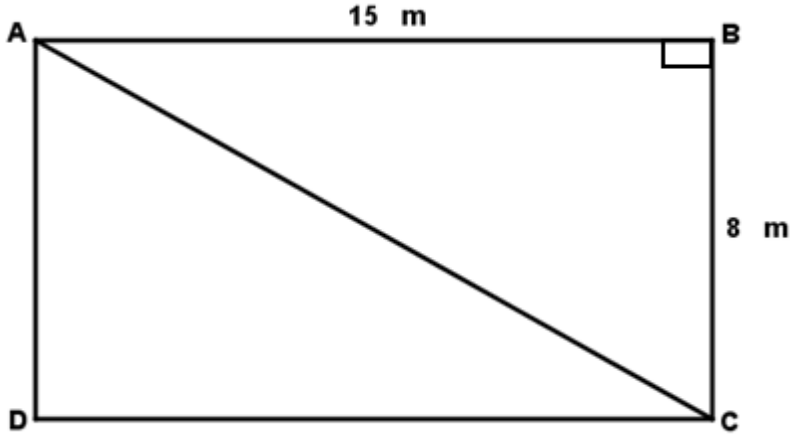
51. What is the size of $\widehat{A}$?

A 56^0

B 68^0

C 112^0

D 136^0 (1)



52. What is the length of AC?

A 13 m

B 23 m

C 17 m

D 15 m (1)

A rectangle has a perimeter of 40 cm.

53. What is the maximum area of the rectangle?

A 75 cm^2

B 84 cm^2

C 100 cm^2

D 160 cm^2 (1)

A rectangle ABCD is divided into 20 equal smaller rectangles.

AB = 5 cm and BC = 4 cm.

54. What is the area of 2 smaller rectangles?

A 1 cm^2

B 2 cm^2

C 3 cm^2

D 4 cm^2 (1)

The circle has an area of 36π mm^2.

55. What is the circumference of a circle?

A 12π mm

B 18π mm

C 36 mm

D 72 mm (1)

A baked pie with radius of 3 cm is divided equally amongst 3 children.

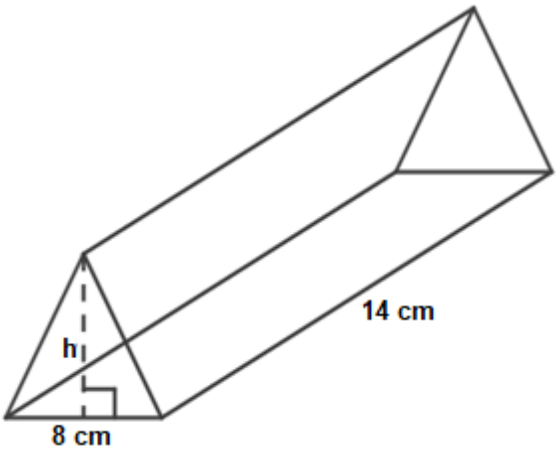
56. What is the length of the part of the circumference obtained by 2 children, correct to 2 decimal places?

A 6,28 cm

B 12,57 cm

C 37,70 cm

D 56,55 cm (1)



h = 6 cm

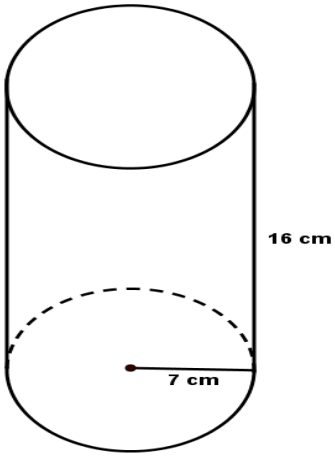
57. What is the volume of the triangular prism?

A 336 cm^3

B 672 cm^3

C 168 cm^3

D 504 cm^3 (1)



58. What is the surface area?

A 709 cm^2

B 735 cm^2

C 1716 cm^2

D 1012 cm^2 (1)

The capacity of a can is 300 ml and the height of the can is 13 cm.

59. What is the diameter of the can, correct to 2 decimal places?

A $2{,}71$ cm

B $5{,}42$ cm

C $11{,}5$ cm

D $17{,}03$ cm (1)

The surface area of a rectangular prism is 3640 cm^2, the width is double the height and height = 140 mm.

60. What is the length of the prism?

A 26 cm

B 13 cm

C 34 cm

D 70 cm (1)

[60]

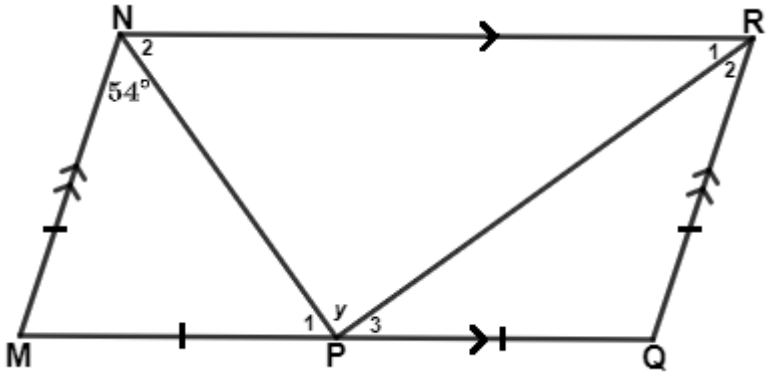
SECTION B

$2y = 2x + 4$

61. Sketch the graph representing the above equation. (3)

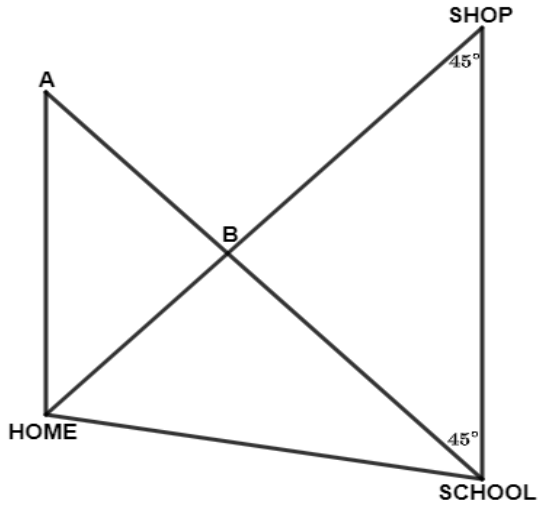
A$(1\ ;\ 2)$,B $(-2\ ;\ 3)$, C$(-4\ ;\ -1)$ are the vertices of ΔABC.

62. Draw the image of ΔABC after the translation $(x\ ;\ y) \longrightarrow (x\ ;\ y-4)$. (3)



NMQR is a parallelogram, $\text{M}\widehat{\text{N}}\text{P} = 54^0$, $\text{N}\widehat{\text{P}}\text{R} = y$, MN = MP, RQ = QP.

63. What is the value of y? (Give reasons for your statements.) (4)



Jabu travelled 2 km from home to point A.

He then travelled from point A to B.

The distance from home to B is 1 km.

He further travelled 3 km from point B to the shop and then straight to school.

In the afternoon he travelled from school straight home.

64. What is the total distance travelled on the day, correct to 1 decimal place? (5)

[15]

End of test