basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2023 GRADE 9 PILOT STUDY

Subject: Mathematics

Paper: 2

Marks: 75

Duration: 120 Minutes

excluding 15 minutes reading time

This test consists of 24 pages, excluding the cover page.

Instructions to the learner:

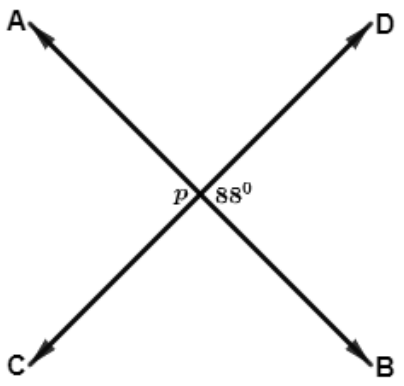
1. You will receive 15 minutes reading time before you begin answering this test.
2. Read all the instructions and questions carefully.
3. Answer all questions.
4. Use the provided answer sheet to write all your answers.
5. Do your calculations before choosing the correct answer in Section A.
6. ALL calculations must be shown in Section B.
7. Non-programmable scientific calculators may be used, unless you are told not to do so in some questions.
8. Diagrams are not necessarily drawn to scale, all lines are regarded as straight lines unless otherwise stated.

This test starts on the next page.

Do not start to write until you are told to do so.

SECTION A

1.



Lines AB and CD are straight lines.

Why is $p = 88^\circ$?

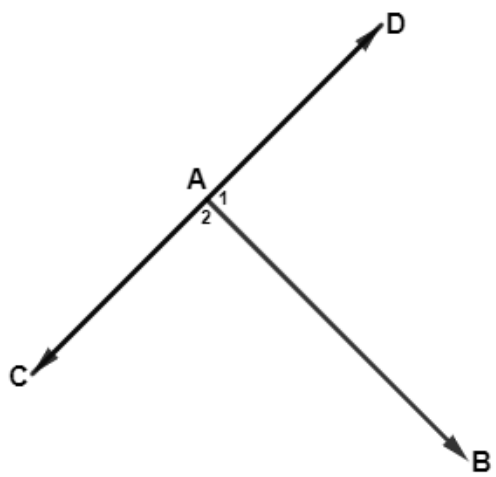
A It is adjacent to 88°.

B It alternates with 88°.

C It is vertically opposite to 88°.

D It corresponds with 88°. (1)

2.



AB⊥CD

What is the size of $\hat{A}_1$?

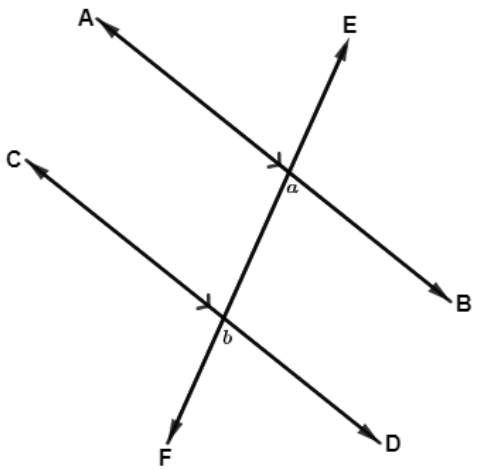
A 270°

B 180°

C 45°

D 90° (1)

3.



What is the relationship between angles marked a and b?

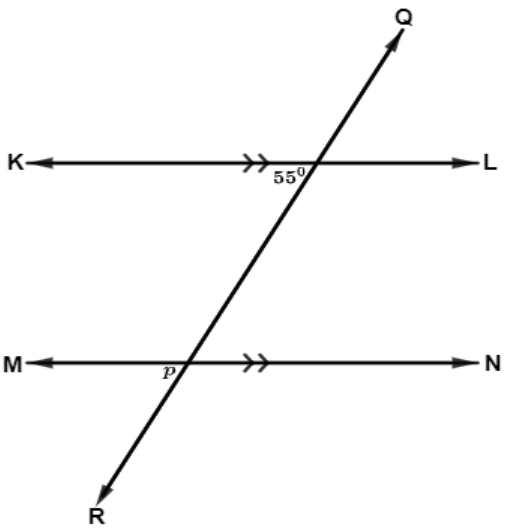
A Complementary angles.

B Co-interior angles.

C Corresponding angles.

D Alternate angles. (1)

4.



What is the value of p?

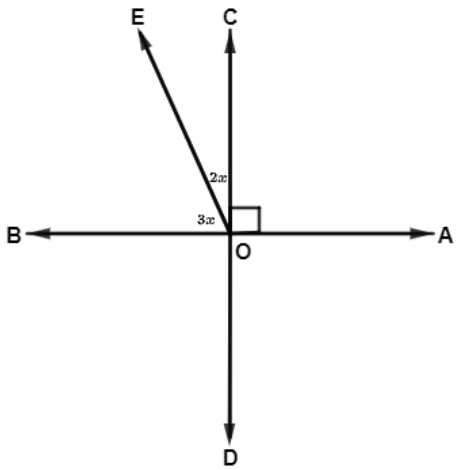
A $125°$

B $55°$

C $145°$

D $35°$ (1)

5.



What is the size of E$\widehat{O}$B?

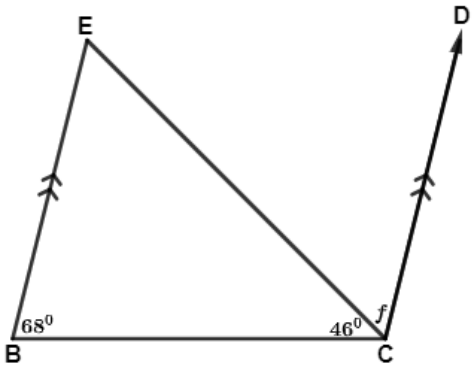
A $54°$

B $90°$

C $18°$

D $36°$ (1)

6.



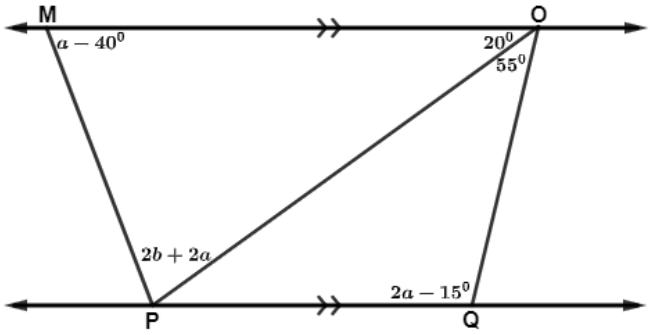
What is the value of f?

A $68°$

B $66°$

C $46°$

D $44°$ (1)

7. 

What is the value of b?

A $10°$

B $20°$

C $40°$

D $60°$ (1)

8. A right-angled triangle is a triangle with …

A one right angle and two acute angles.

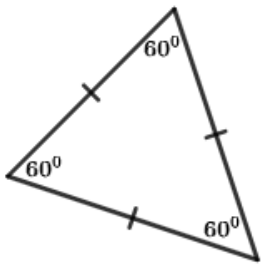
B one right angle and two obtuse angles.

C one right angle, one reflex angle and one acute angle.

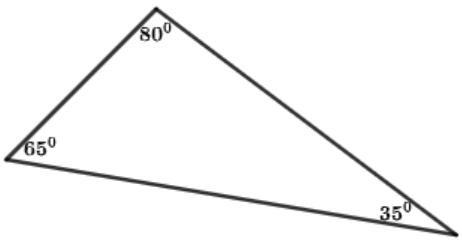
D one right angle, one reflex angle and one obtuse angle. (1)

9. Which one of the following triangles is an equilateral triangle?

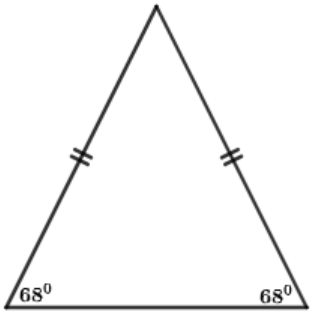
A



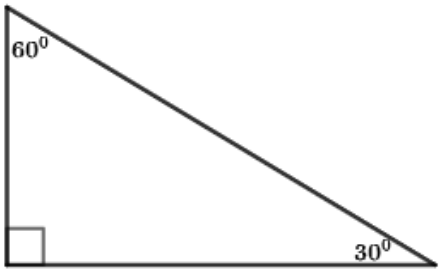
C



B



D



(1)

10. Which one of the following statements best describes a kite?

A The diagonals are perpendicular, one diagonal bisects the other diagonal and one diagonal bisects the angles at the vertices.

B The diagonals are perpendicular and bisect each other, bisect the angles at the vertices.

C The diagonals are perpendicular and bisect each other.

D The diagonals are perpendicular and do not bisect the angles at the vertices. (1)

11. Which one of the following statements is true for a square?

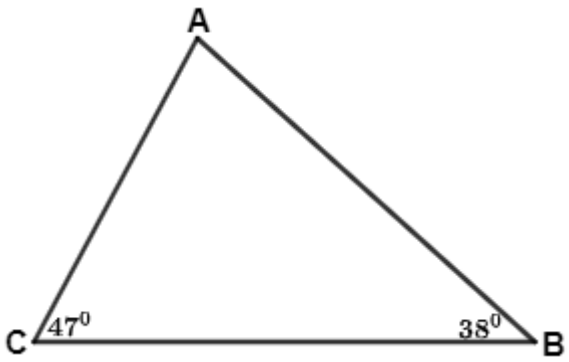
A A square is a trapezium.

B A rectangle is a square.

C A rhombus is a square.

D A square is a rectangle. (1)

12.



What is the size of $\hat{A}$?

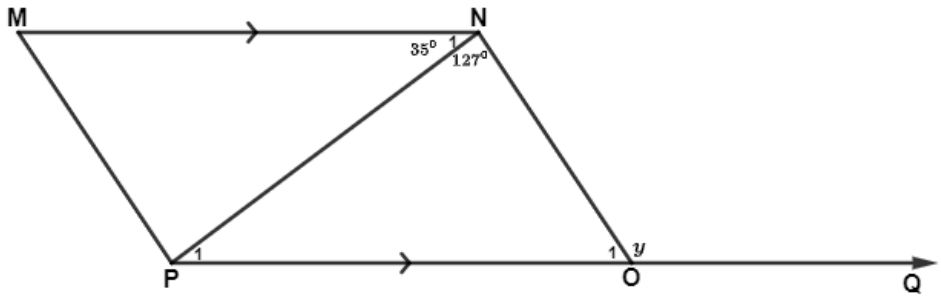
A $85°$

B $95°$

C $47°$

D $38°$ (1)

13.



MN ∥ PQ

What is the value of y?

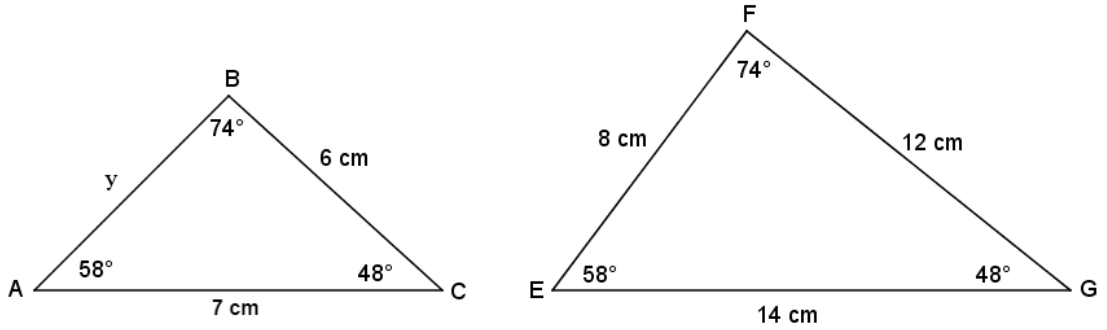
A $162°$

B $92°$

C $127°$

D $35°$ (1)

14.



What is the length of side AB?

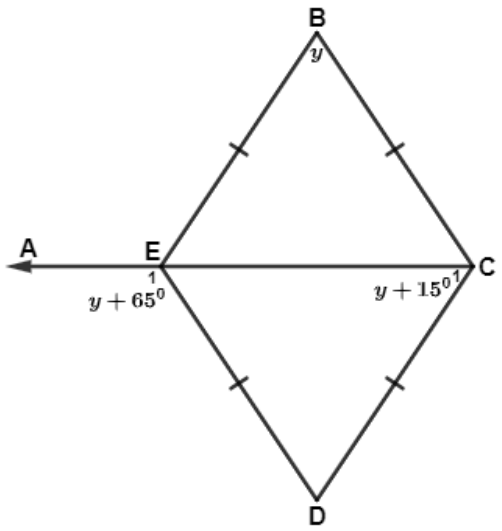
A 4 cm

B 8 cm

C 6 cm

D 7 cm (1)

15.



AEC is a straight line.

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

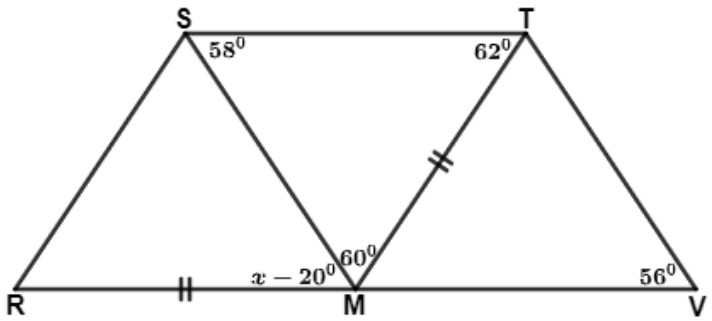
A $115°$

B $180°$

C $50°$

D $65°$ (1)

16.



Δ RMS ≡ Δ TMS

What is the value of x?

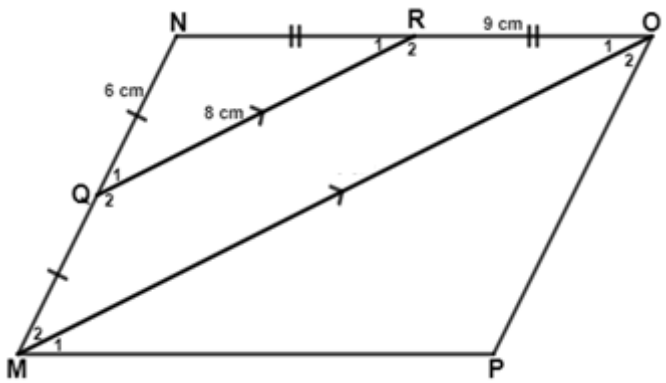
A $80°$

B $78°$

C $76°$

D $82°$ (1)

17.



MNOP is a parallelogram and QR ∥ MO.

What is the length of MO?

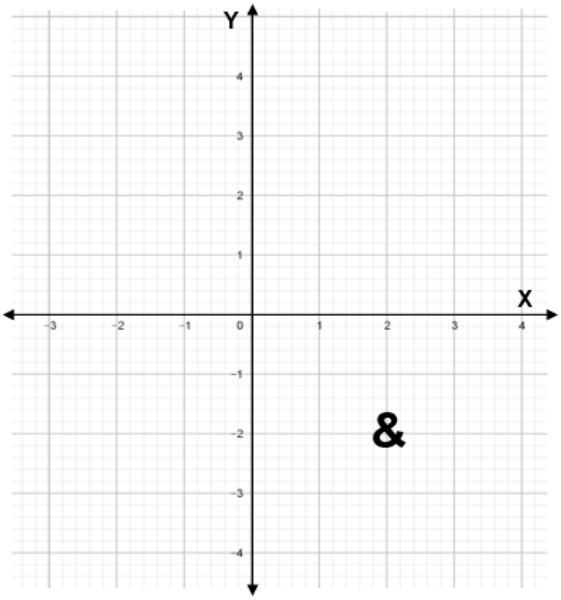
A 15 cm

B 13 cm

C 11 cm

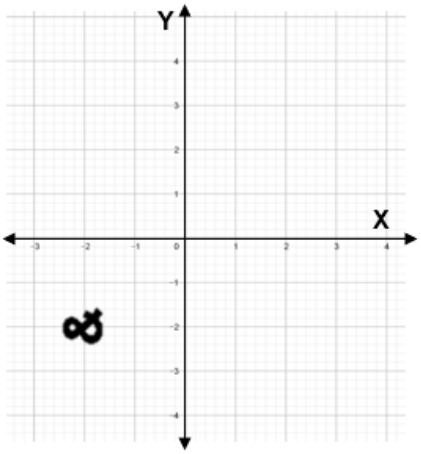
D 16 cm (1)

18.

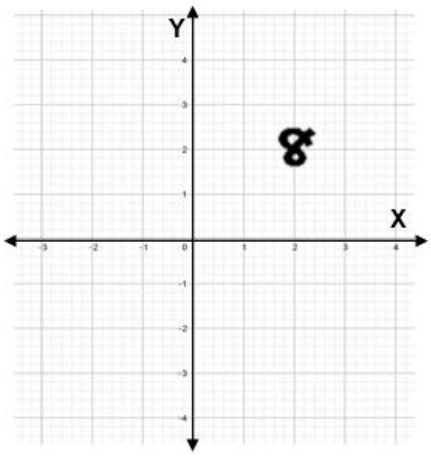


Which one of the following transformations represents reflection in the X-axis?

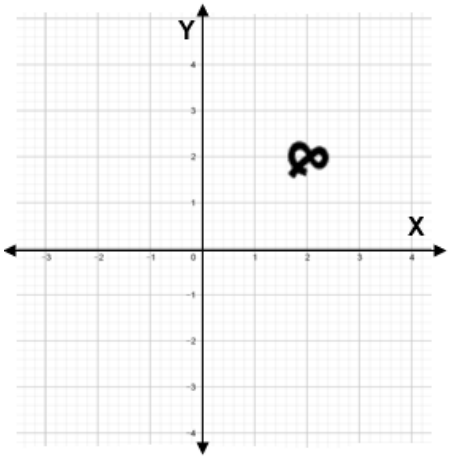
A



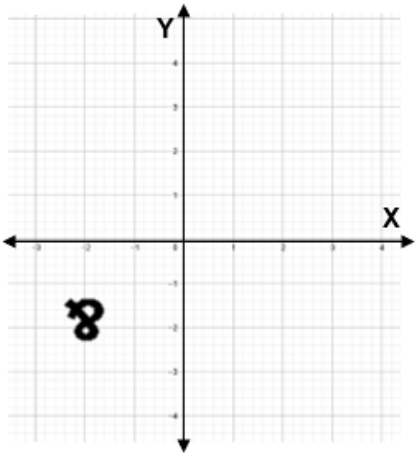
C



B

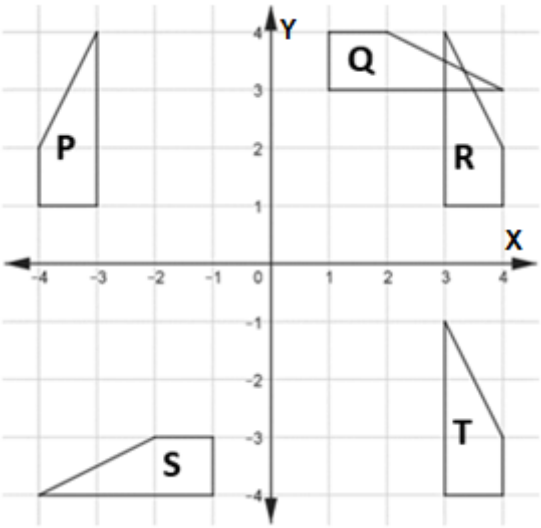


D



(1)

19.



Which two shapes are reflections of each other in the line $y = x$?

A P and R

B S and T

C R and T

D Q and R (1)

20. $P(3\,;\,-1) \rightarrow P'(1\,;\,3)$

Describe the rule used to transform P to its image P′.

A Translated 2 units to up and 4 units to the left.

B Translated 4 units to the left and 2 units up.

C Translated 2 units to the left and 4 units up.

D Translated 4 units up and 2 units to the left. (1)

21. $P'(-2\,;\,-7)$ is the reflection of P in the X-axis.

What are the co-ordinates of P?

A $P(-2\,;\,7)$

B $P(2\,;\,-7)$

C $P(7\,;\,-2)$

D $P(-7{:}\,2)$ (1)

22. What are the co-ordinates of the image of Q$(3\,;\,-5\,)$ when it is reflected in the X-axis and translated 2 units to the left?

A Q$'(-3\,;\,-7)$

B Q$'(1\,;\,-5)$

C Q$'(1\,;\,5)$

D Q$'(-5\,;\,7)$ (1)

23. Point $(x;y)$ is reflected in the Y-axis and translated 1 unit downwards.
What is the rule used to transform point $(x;y)$?

A $(x;y) \rightarrow (x-1\,;\,y)$

B $(x;y) \rightarrow (-x\,;\,y-1)$

C $(\,x;y) \rightarrow (-x\,;\,y)$

D $(x;y) \rightarrow (-x\,;-y)$ (1)

24. Line AB with A$(-5;9)$ and B$(1;2)$ is reflected in the line $y=x$.
What are the co-ordinates of A′ and B′?

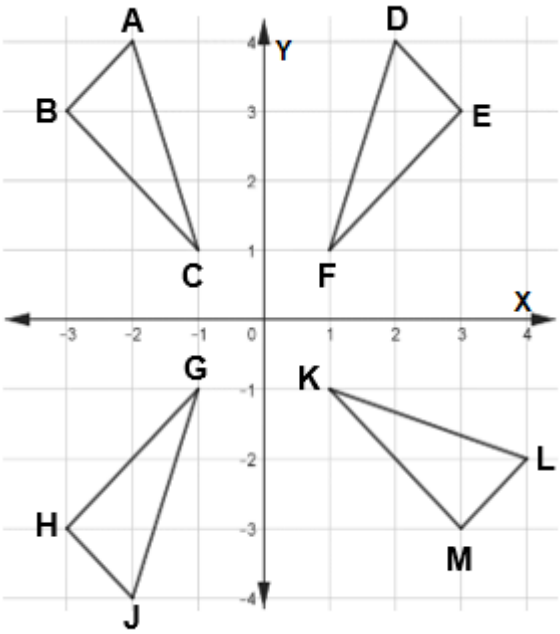
A A$'(9\,;\,5)$ and B$'(2\;\,;\,-1)$

B A$'(-5\,;\,9)$ and B$'(2\,;1)$

C A$'(5\,;\,-9)$ and B$'(-1\,;\,-2)$

D A$'(9\,;\,-5)$ and B$'(2\,;\,1)$ (1)

25.



X$(-2\,;4)$; Y$(-3;3)$and Z$(-1\,;1)$ are coordinates of ΔXYZ.

Which triangle represents the reflection of ΔXYZ in the line $y = x$?

A ΔABC

B ΔDEF

C ΔGHI

D ΔKLM (1)

26. Triangle ABC is an equilateral triangle with AB = 5 cm.

What is the perimeter of triangle ABC?

A 25 cm^2

B 15 cm

C 25 cm

D 15 cm^3 (1)

27. PQRS is a rectangle.

What is the formula to calculate the area of PQRS?

A $A = \frac{1}{2}bh$

B $A = lb$

C $A = l + b$

D $A = 2(l + b)$ (1)

28. $2\pi r$ is used to calculate …

A the area of a circle.

B the perimeter of a circle.

C the radius of a circle.

D the diameter of a circle. (1)

29. What is the formula to calculate the area of a circle?

A $A = 2\pi r^2$

B $A = \pi^2 r$

C $A = 2\pi r$

D $A = \pi r^2$ (1)

30. A circle has an area of 198 cm^2.

What is the diameter, rounded off to TWO decimal places?

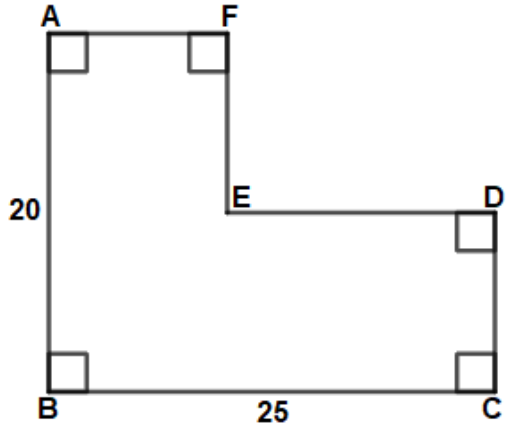
A 63,05 cm

B 15,88 cm

C 12,92 cm

D 31,53 cm (1)

31.



What is the perimeter of the figure ABCDEF?

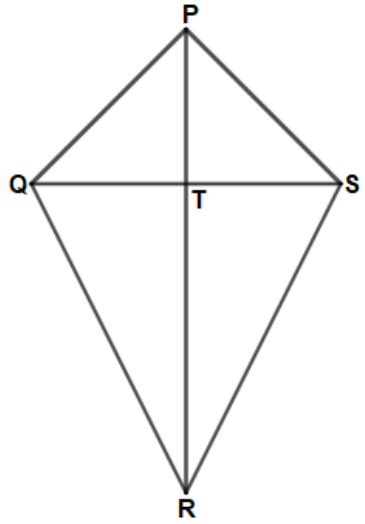
A 65

B 70

C 45

D 90 (1)

32.



PQRS is a kite with PR = 16 cm and TS = 30 mm.

What is the area of the kite?

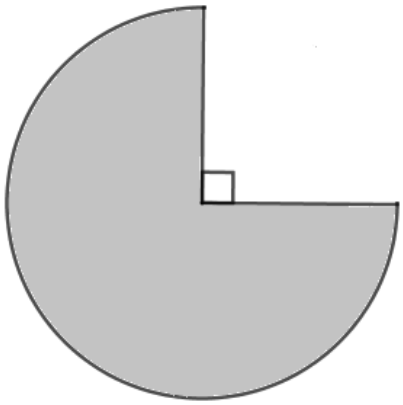
A 11 cm^2

B 24 cm^2

C 48 cm^2

D 96 cm^2 (1)

33.



The diagram represents three quarters of a circle.

The diameter of the circle is 30 cm.
What is the area of the shaded part (rounded off to the nearest whole number)?

A 177 cm^2

B 530 cm^2

C 617 cm^2

D 707 cm^2 (1)

34. DEFG is a rhombus with diagonals DF $= 6x$ cm and EG $= 0{,}08x$ m.

What is the perimeter of rhombus DEFG in terms of x (rounded off to the nearest whole number)?

A $12x$ cm

B $20x$ cm

C $14x$ cm

D $11x$ cm (1)

35. The wheel of the toy car has a diameter of 5 cm.

How many times will the wheel turn if the car covers 2 m (rounded off to the nearest whole number)?

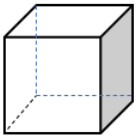
A 7 times

B 8 times

C 10 times

D 13 times (1)

36.



The volume of a cube is 64 cm^3.

What is the length of a side of the cube in mm?

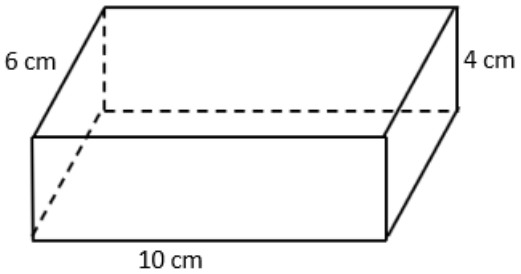
A 0,04 mm

B 400 mm

C 40 mm

D 0,4 mm (1)

37.



What is the surface area of the rectangular prism?

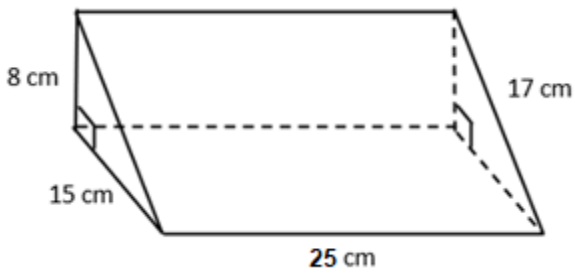
A 328 cm^2

B 240 cm^2

C 124 cm^2

D 248 cm^2 (1)

38.



What is the surface area of the prism?

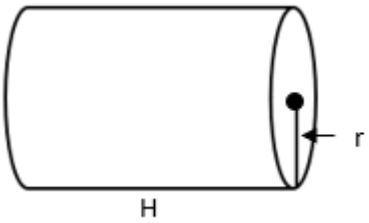
A 1120 cm^2

B 1060 cm^2

C 745 cm^2

D 831 cm^2 (1)

39.



Which formula is used to determine the surface area of the cylinder?

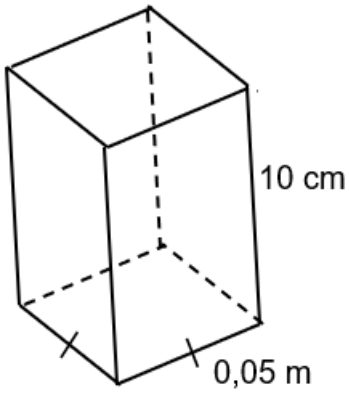
A $\text{SA} = \pi r^2 + 2\pi rH$

B $\text{SA} = 2\pi r^2 + 2\pi rH$

C $\text{SA} = 2\pi r + \pi rH$

D $\text{SA} = 2\pi r + 2\pi rH$ (1)

40.



The square-based prism has a side of 0,05 m and a height of 10 cm.

What is the volume in cm^3?

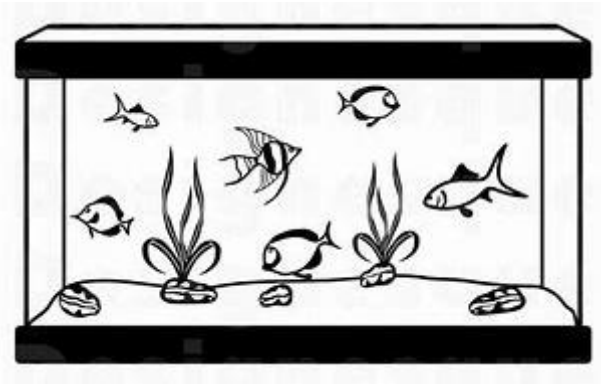
A 0,025 cm^3

B 125 cm^3

C 250 cm^3

D 2,50 cm^3 (1)

41.



The inside measurement of a fish tank is 90 cm by 400 mm by 600 mm.

What is the capacity of the tank?

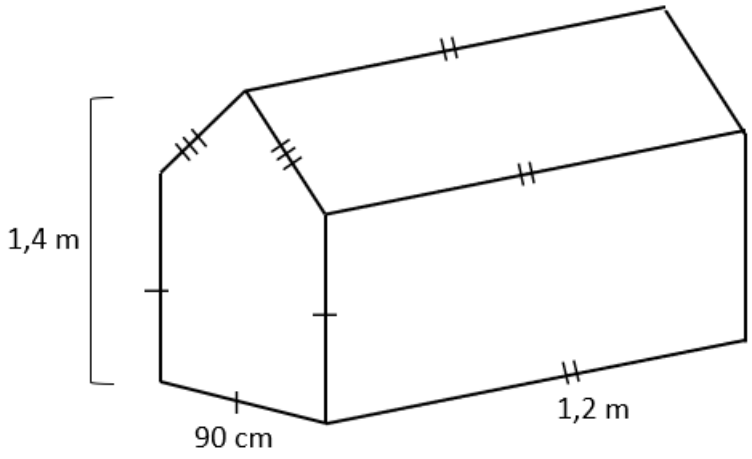
A 216 000 litre

B 216 litre

C 216 cm^3

D 216 000 cm^3 (1)

42.



The height of the dog kennel is 1,4 m high.

Determine the volume of the dog kennel in m^3.

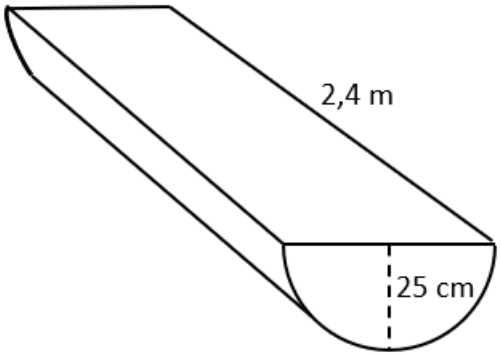
A 1,197 m^3

B 1,242 m^3

C 100,35 m^3

D 127,68 m^3 (1)

43.



What is the surface area of this half cylinder?

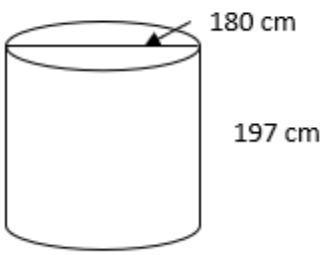
A 3,28 m^2

B 8,20 m^2

C 244,08 m^2

D 128,24 m^2 (1)

44.



The height of the water tank is 197 cm and the diameter is 180 cm.
After some heavy rains, the water lies at the 450 l mark in the tank.

What percentage of the tank will be filled with water?

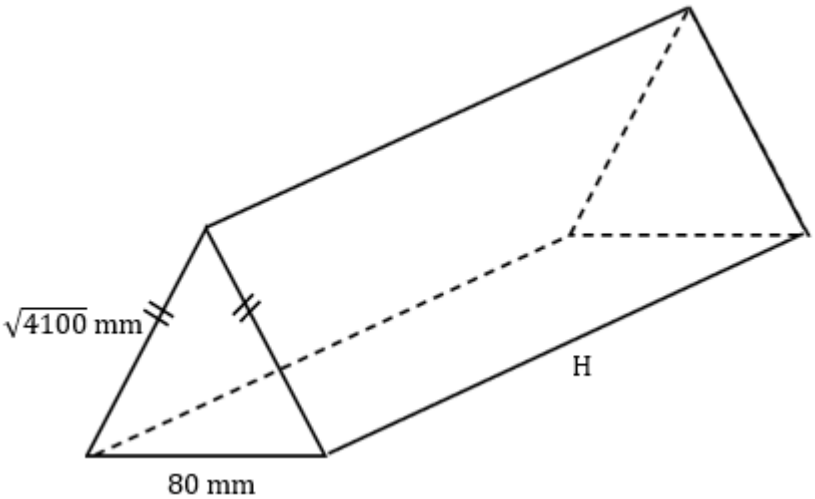
A 4,04%

B 8,98%

C 0,81%

D 24,76% (1)

45.



A cardboard container can hold 300 ml of chocolate milkshake.

What is the height of the container as shown above?

A 150 cm

B 150 mm

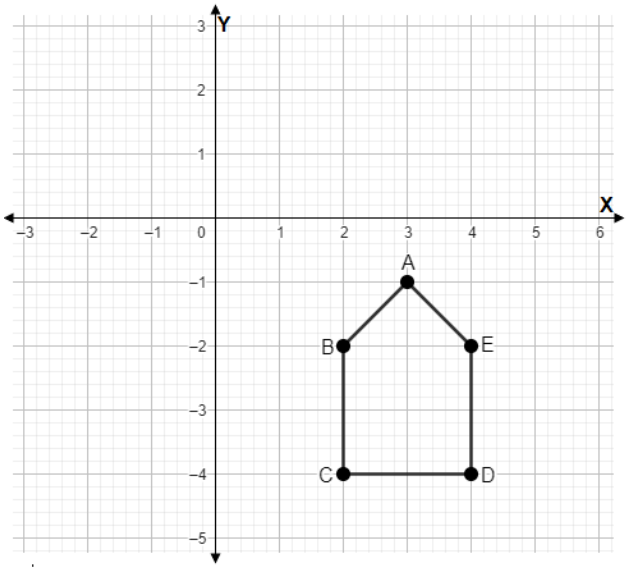
C 9,9 mm

D 1,5 cm (1)

[45]

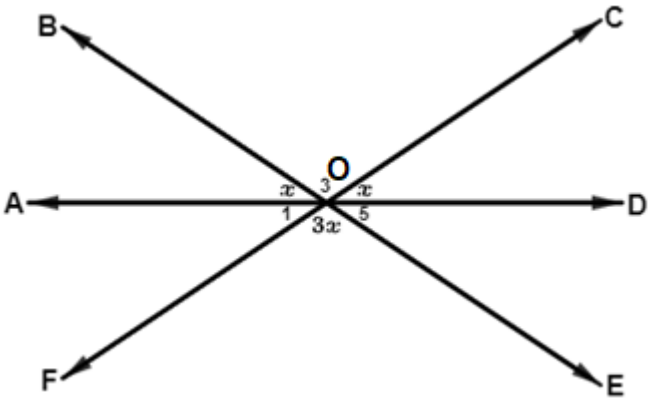
SECTION B

46.



Translate the polygon five units to the left and one unit up. (3)

47.



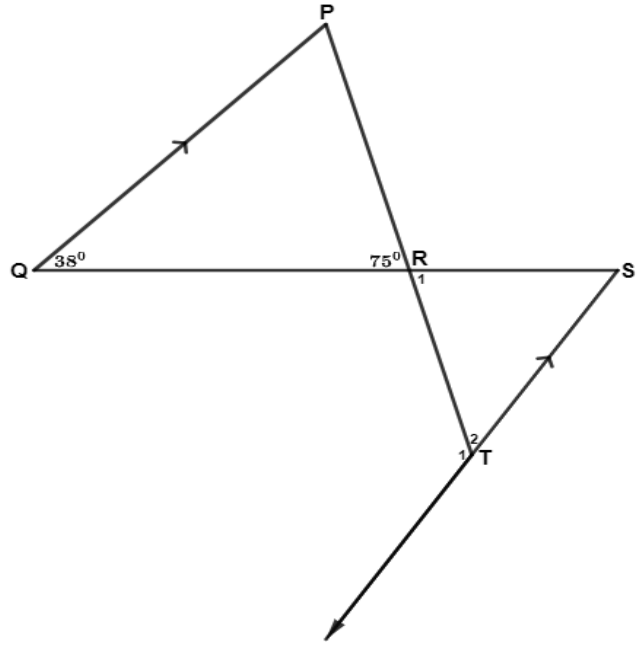
Straight lines AD, BE and CF intersect at O.

What is the value of x? (4)

48. The area of a triangle is 100 cm^2 and its base is 40 mm.

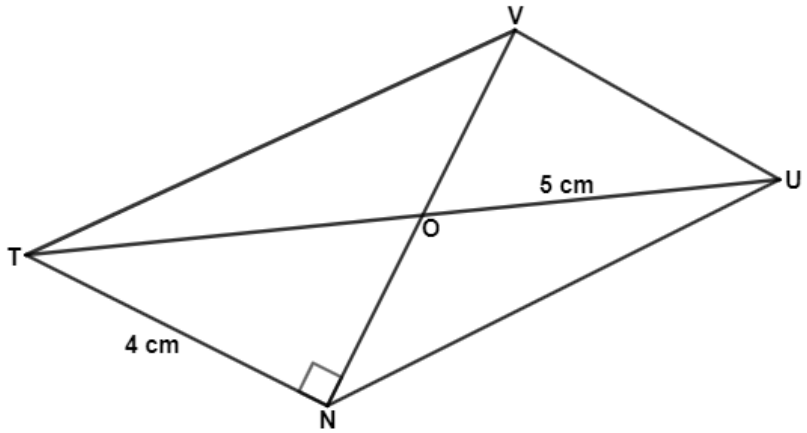
What is the perpendicular height of the triangle? (3)

49.



What is the size of $\hat{T}_1$? (5)

50.



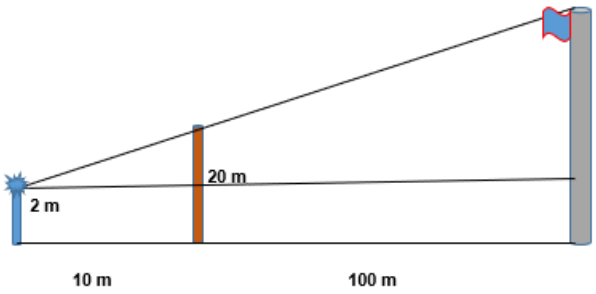
TVUN is a parallelogram.

What is the length of ON? (5)

51. A company stores boxes in a room with a length of 5 m, breadth of 3 m and height of 2 m.

How many boxes can fit in this room if each box is 10 cm long, 6 cm wide and 4 cm high? (4)

52.



A grade 9 class wants to determine the height of the school's flag pole from the ground.
They use a laser light source mounted on a structure with height 2 m from the ground, to shine light over the wooden beam.
The light shines over the 20 m high wooden beam to the top of the flag pole.
The distance between the flag pole and the wooden beam is 100 m.
The distance between the wooden beam and the light source structure is 10 m.

Determine the height of the flag pole. (6)

[30]

End of test