LAVINGTON GIRLS SENIOR SCHOOL

END OF YEAR HOLIDAY ASSIGNMENT 2026

GRADE 10 CORE MATHEMATICS

Name: _____

Steam.....

Assessment Number: _____

INSTRUCTIONS TO CANDIDATES

1. Write the details as required in the spaces above.
2. This paper consists of two sections: A and B.
3. Answer **all** questions in Section A and Section B.
4. Answer the questions in English.
5. All answers **MUST** be written in the spaces provided in the paper.
6. Do **NOT** remove any page from this question paper.

SECTION A (30 MARKS)

Answer ALL questions in this section.

1. Without using a calculator, answer the following.

   a) Evaluate $27^{2/3}$. **(2 marks)**

   b)Express 1/16 as a power of 2. **(1 mark)**

2. a) Write $3^4 = 81$ in logarithmic form. **(1 mark)**

b) Without using a calculator, evaluate $\log_2 8 + \log_2 4$. **(2 marks)**

3. a) Expand and simplify $(x + 4)(x – 3)$. **(2 marks)**

b) Factorise $x^2 – 9$. **(1 mark)**

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4. Solve the equation $x^2 + 2x – 15 = 0$. **(3 marks)**

5. A ladder 6.5 m long rests against a vertical wall with its foot 2.5 m from the base of the wall, as shown in Figure 1.

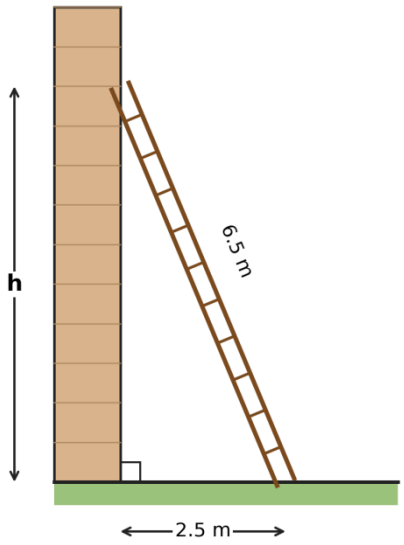


Figure 1

Calculate the height, h, that the ladder reaches up the wall. **(3 marks)**

6. In a right-angled triangle, the two shorter sides measure 3 cm and 4 cm. The angle θ lies opposite the 3 cm side.

a) State the length of the longest side of the triangle. **(1 mark)**

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b) Write down sin θ and cos θ as fractions. **(2 marks)**

sin θ = _____

cos θ = _____

7. Figure 2 shows a sector of a circle of radius 14 cm and angle 45° at the centre.

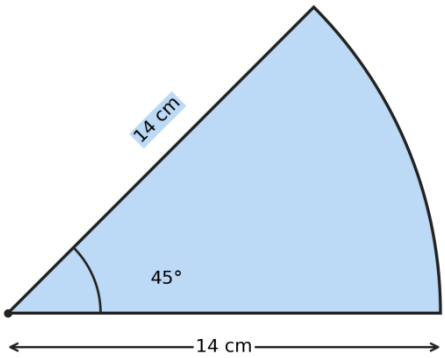


Figure 2

Calculate the area of the sector. (Take $\pi = 22/7$) **(3 marks)**

8. Two similar rectangles have lengths 6 cm and 9 cm respectively. The area of the smaller rectangle is 24 cm^2.

Calculate the area of the larger rectangle. **(3 marks)**

9. Figure 3 shows triangles ABC and PQR.

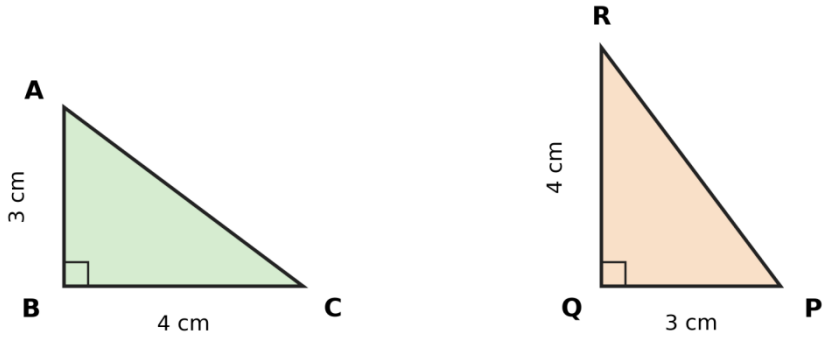


Figure 3

a) State the condition that shows that the two triangles are congruent. **(1 mark)**

b) Calculate the length of PR. **(2 marks)**

10. The marks obtained by five learners in a test out of 20 were: 4, 6, 6, 8, 11. Determine the:

a) mode; **(1 mark)**

b) median; **(1 mark)**

c) mean. **(1 mark)**

SECTION B (60 MARKS)

Answer ALL questions in this section.

11. Figure 4 shows the graph of $y = x^2 - 2x - 3$.

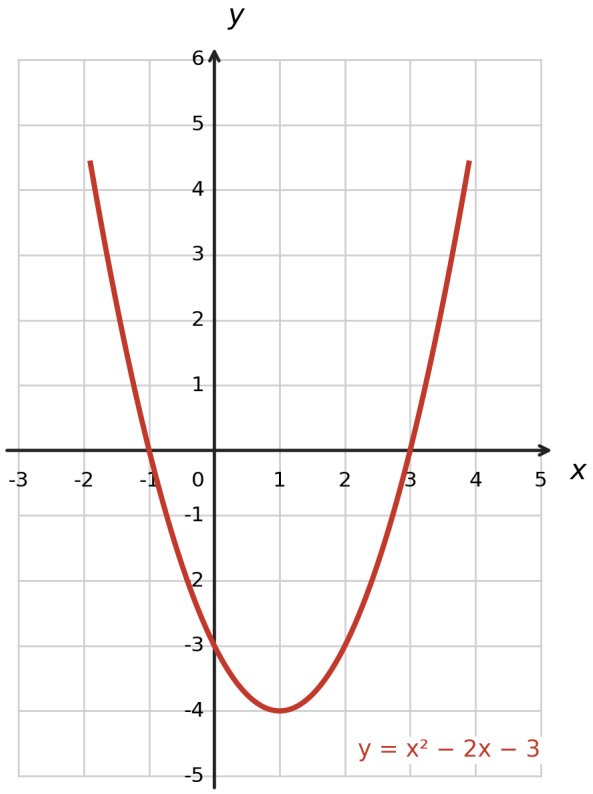


Figure 4

a) State the roots of the equation $x^2 - 2x - 3 = 0$. **(1 mark)**

b) State the coordinates of the turning point of the curve. **(1 mark)**

c) Write down the equation of the line of symmetry of the curve. **(1 mark)**

d) State the range of values of x for which $y < 0$. **(1 mark)**

12. a) Solve the equation $3^{2x-1} = 27$. **(2 marks)**

b) Given that log 2 = 0.3010 and log 3 = 0.4771, evaluate log 18 without using a calculator. **(2 marks)**

13. A learner standing at point P, 40 m from the foot of a vertical tower, measures the angle of elevation of the top of the tower, T, as 35°, as shown in Figure 5. (Use tan 35° = 0.7002)

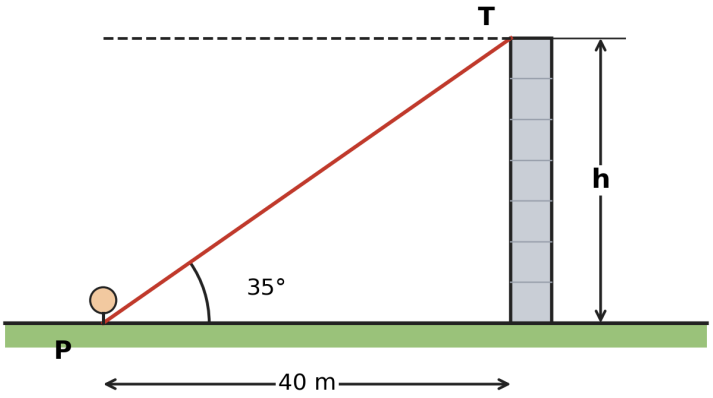


Figure 5

a) Calculate the height, h, of the tower, correct to 1 decimal place. **(3 marks).**

b) Calculate the distance PT. **(2 marks)**

c) A friend at the top of the tower looks down at the learner at P. State the angle of depression of P from T and give a reason. **(2 marks)**

14. Figure 6 shows a triangular prism whose cross-section is a right-angled triangle with sides 6 cm, 8 cm and 10 cm. The length of the prism is 12 cm.

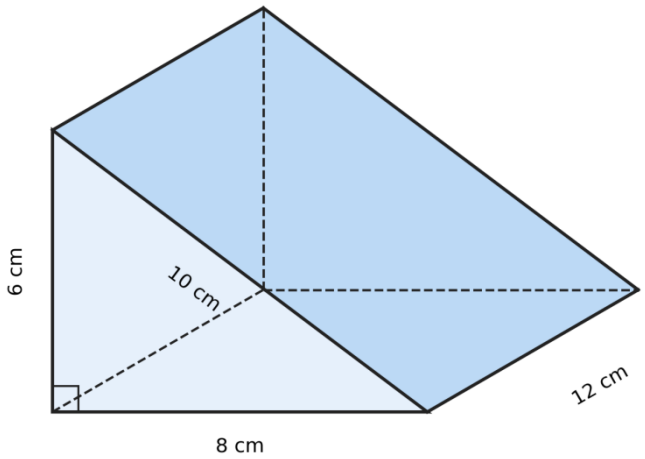


Figure 6

a) Calculate the volume of the prism. **(2 marks)**

b) Calculate the total surface area of the prism. **(3 marks)**

15. A cylindrical water tank has a radius of 70 cm and a height of 100 cm. (Take $\pi = 22/7$)

a) Calculate the volume of the tank in cm^3. **(2 marks)**

c) Convert the volume in (a) to litres. (1 litre = 1000 cm^3) **(1 mark)**

d) A jerrycan holds 20 litres. Calculate the number of full jerrycans that can be filled from the tank. **(1 mark)**

16. In Figure 7, DE is parallel to BC. AD = 4 cm, DB = 2 cm and DE = 5 cm. (The figure is not drawn to scale.)

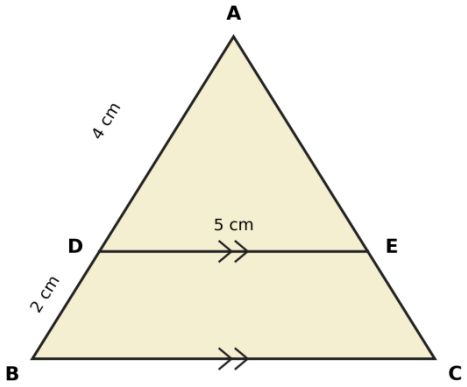


Figure 7

a) Give a reason why triangles ADE and ABC are similar. **(1 mark)**

c) Calculate the length of BC. **(2 marks)**

d) The area of triangle ADE is 20 cm^2. Calculate the area of triangle ABC. **(2 marks)**

17. Figure 8 shows triangle ABC drawn on a grid.

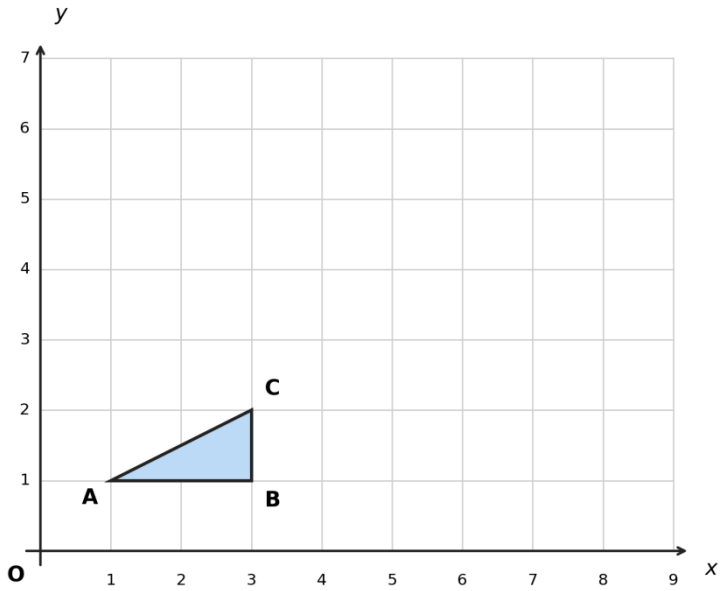


Figure 8

a) On Figure 8, draw the image A′B′C′ of triangle ABC under an enlargement with centre O(0, 0) and scale factor 2. **(3 marks)**

b) Find the area of triangle ABC in square units. **(1 mark)**

c) Hence, find the area of triangle A′B′C′. **(2 marks)**

18. Figure 9 shows triangle PQR drawn on a grid.

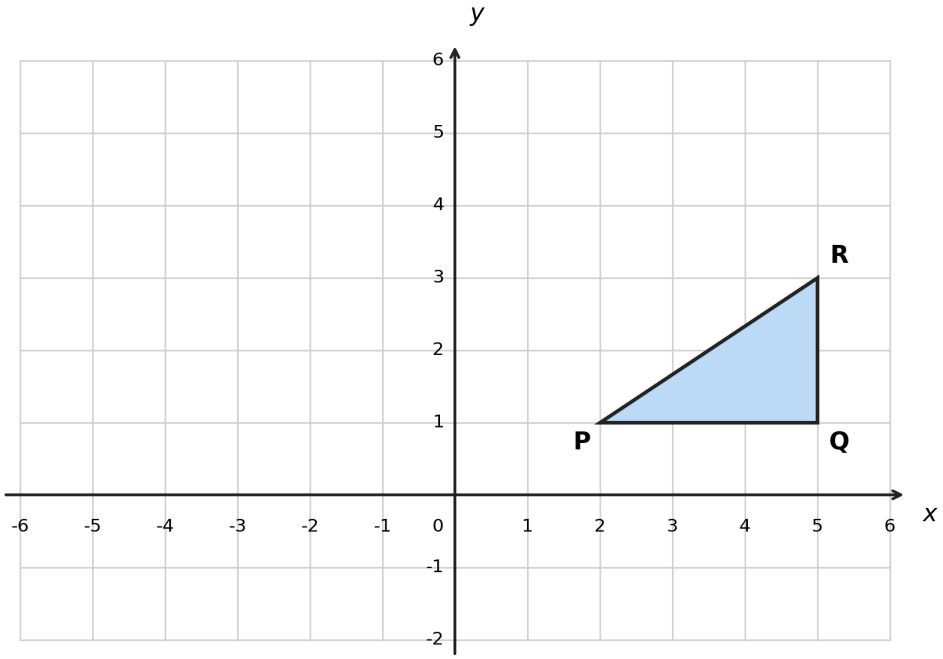


Figure 9

a) On Figure 9, draw the image P′Q′R′ of triangle PQR after a reflection in the y-axis. **(3 marks)**

b) On the same grid, draw the image P″Q″R″ of triangle PQR after a rotation of 90° anticlockwise about the origin. **(3 marks)**

c) State the relationship between triangle PQR and triangle P′Q′R′. **(1 mark)**

19. Figure 10 shows a kite ABCD in which AB = AD and CB = CD. The diagonal AC is drawn.

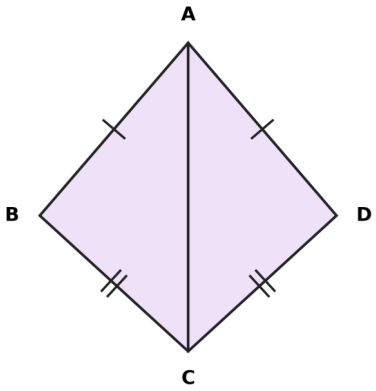


Figure 10

a) Prove that triangles ABC and ADC are congruent. **(4 marks)**

b) Hence, state the angle that is equal to ∠ABC. **(1 mark)**

c) Name the line of symmetry of the kite. **(1 mark)**

20. Figure 11 is a bar chart showing how the learners in a class travel to school.

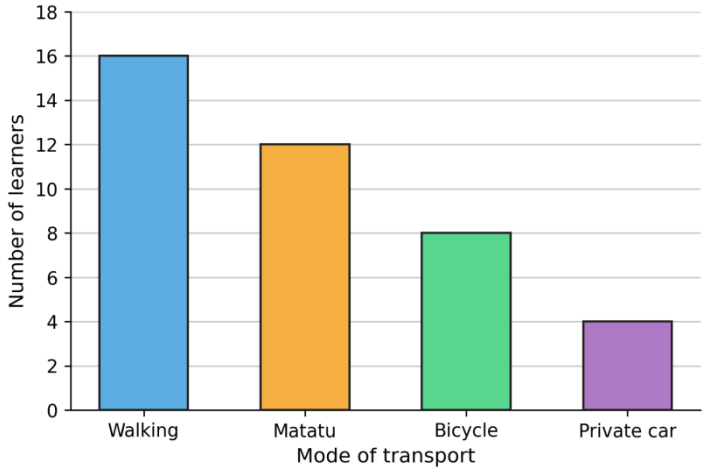


Figure 11

a) Determine the total number of learners in the class. **(1 mark)**

b) State the modal mode of transport. **(1 mark)**

d) The data is to be shown on a pie chart. Calculate the angle that represents learners who travel by matatu. **(2 marks)**

d) A learner is chosen at random. Find the probability that the learner walks to school. **(1 mark)**

e) A learner is chosen at random. Find the probability that the learner travels by bicycle or private car. **(1 mark)**

21. A bag contains 3 red balls and 2 blue balls. A ball is picked at random, its colour is noted and it is replaced. A second ball is then picked. Figure 12 shows the tree diagram for the experiment.

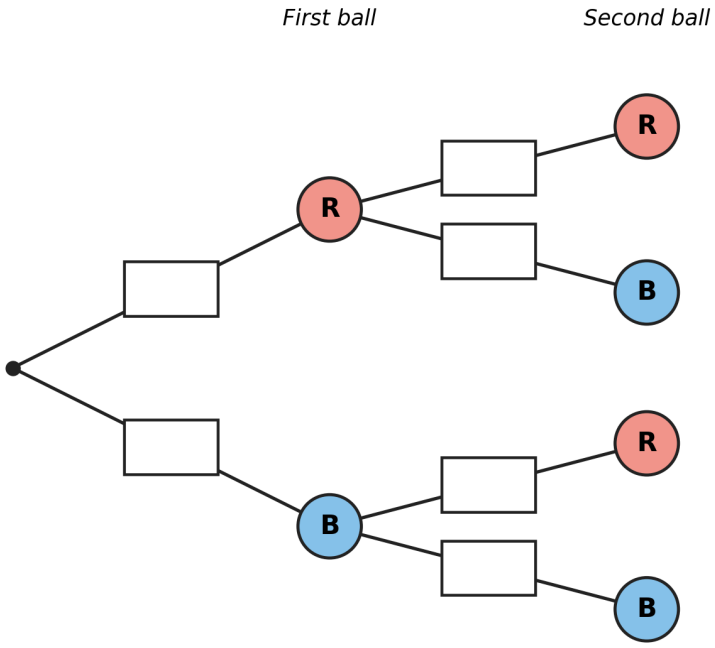


Figure 12

a) Complete the tree diagram in Figure 12 by writing the probabilities in the boxes provided. **(2 marks)**

b) Calculate the probability that both balls are red. **(2 marks)**

c) Calculate the probability that the two balls are of different colours. **(2 marks)**

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