



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CORE MATHEMATICS

School Based Assessment

Grade 10

September/October 2026

Time: 2 hours

Name: _____ Assessment No.: _____

School Name: _____ Signature: _____

Instructions

- (i) Write your name, your assessment Number, your schools name in the space provided.
- (ii) Attempt **ALL** questions in **Sections A and B**.
- (iii) In section A, circle the correct response.
- (iv) In section B, write your responses in the spaces provided below each question.
- (v) Additional space for answers and **rough work** is provided at the end of this booklet.
- (vi) Use **blue or black ink** only.
- (vii) All responses must be written in **English**.
- (viii) For π , use either the calculator value or 3.142.
- (ix) Non-programmable calculators may be used

For Teacher's Use Only

	Max. Score	Learner's score
Task 1 - Numbers (Qns 1, 2, 3, 6, 21, 22)	10	
Task 2 - Algebra (Qns 4, 14, 15, 17, 23, 32, 34)	15	
Task 3 - Geometry (Qns 5, 8, 12, 16, 24, 25, 26, 27, 33, 35)	29	
Task 4 - Measurements (Qns 7, 9, 10, 11, 13, 18, 19, 20, 28,29,30,31)	21	
Total	75	

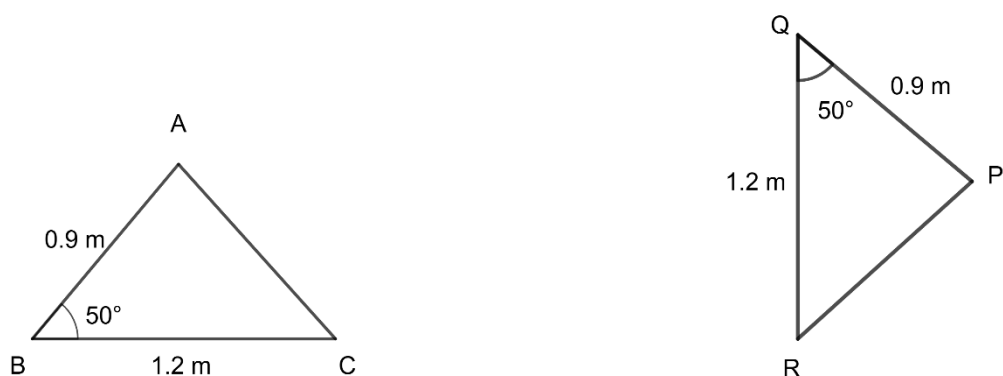
Section A (15 marks)

Answer all the questions in this section by circling the correct response.

1. The speeds (in km/h) of nine motorcyclists passing through a police checkpoint were recorded as follows: 26, 29, 33, 44, 49, 51, 53, 61, 69.
What is the total sum of the speeds that are prime numbers?
A. 143
B. 192
C. 194
D. 345
2. A tractor uses 1.378 litres of fuel per kilometre. Using reciprocal tables, which of the following gives the number of kilometres the tractor can travel on one litre of fuel?
A. 0.7343
B. 0.7299
C. 0.7257
D. 0.7255
3. A farmer records 100 seedlings in a nursery. The number of seedlings remains unchanged during the first 2 hours. After this period, the number of seedlings, N , is given by:
$$N = 100 \times 4^{x-2}, x \geq 2.$$

How many hours after the farmer first records the seedlings will the number of seedlings reach 1,600?
A. 6
B. 5
C. 4
D. 2
4. While factorising the quadratic expression $2x^2 - 13x - 15$, learners needed to rewrite the middle term as the sum of two terms to allow for factorisation by grouping.
Which of the following shows the correct way to rewrite the middle term?
A. $2x^2 - 3x - 10x - 15$
B. $2x^2 - 2x + 15x - 15$
C. $2x^2 + 3x + 10x - 15$
D. $2x^2 + 2x - 15x - 15$

5. The figure below shows two congruent triangular wooden frames, triangle ABC and triangle PQR. In triangle ABC, $AB = 0.9$ m, $BC = 1.2$ m and $\angle ABC = 50^\circ$. In triangle PQR, $PQ = 0.9$ m, $QR = 1.2$ m and $\angle PQR = 50^\circ$.



Which of the following statements correctly identifies the congruence test used to prove that the two road signs are congruent?

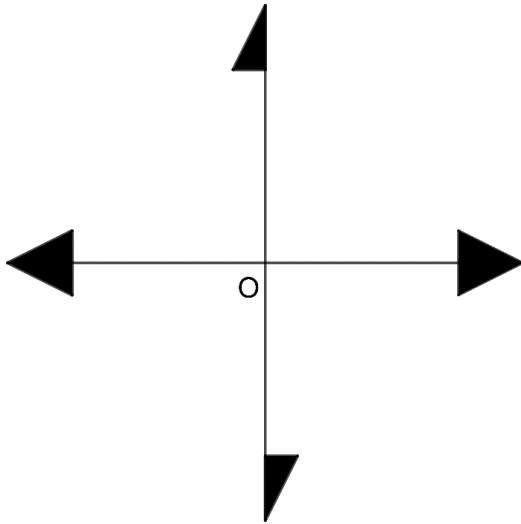
- A. Angle-Angle-Side (AAS)
 - B. Side-Angle-Side (SAS)
 - C. Side-Side-Side (SSS)
 - D. Angle-Side-Angle (ASA)
6. A sound signal passes through several stages of amplification and transformation. Each stage changes the signal strength by a factor expressed as a power of 10. The overall signal strength, P , after all stages is given by:

$$P = \frac{(10^{2.3})^2 \times \sqrt[3]{10^{0.24}}}{10^{-1.5}}$$

What is the value of $\log_{10} P$?

- A. 6.90
 - B. 6.22
 - C. 6.18
 - D. 3.18
7. A piece of land is in the shape of a triangle. The lengths of its sides are 39m, 41m, and 50m. What is the area, in hectares, of the triangular piece of land?
- A. 0.0078
 - B. 0.078
 - C. 0.78
 - D. 7.8

8. The diagram below shows a wind turbine. An engineer was tasked with inspecting the wind turbine to determine whether it will rotate smoothly by analysing its rotational symmetry.



What is the order of the rotational symmetry of the turbine about O?

- A. 0
 - B. 1
 - C. 2
 - D. 4
9. The figure below shows a coin shaped as a regular heptagon. A Grade 10 learner traced the outline of the coin onto a sheet of paper, resulting in a regular heptagon of side 1.3 cm.

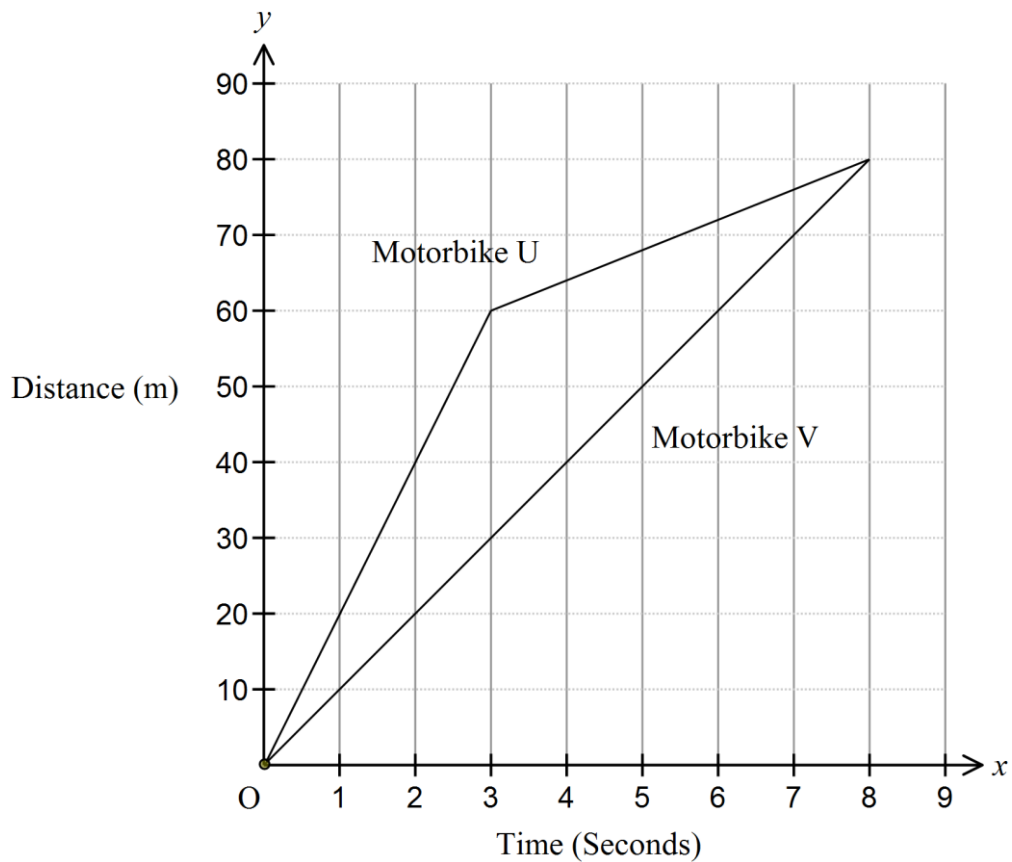


What is the area of the traced heptagon, in cm^2 , correct to one decimal place?

- A. 0.9
- B. 1.4
- C. 5.1
- D. 6.1

10. A circular fish pond has a radius of 3.5 m, with its centre marked as point O. Two points, A and B, are marked on the edge of the pond such that $\angle AOB = 60^\circ$. The straight-line joining A and B represents a chord of the pond.
What is the area of the minor segment of the circular fountain formed by chord AB and the corresponding minor arc. (Take $\pi = 3.142$.)
- A. 1.111
B. 5.304
C. 6.415
D. 11.72
11. A model of a ventilation system consists of an open upright conical funnel of radius 5 cm and vertical height 12 cm, mounted on top of a cylindrical pipe with the same radius. The cylindrical pipe is 10 cm long and is open at both ends.
What is the total outer surface area of the ventilation system model? (Take $\pi = 3.142$)
- A. 361.3
B. 502.7
C. 518.4
D. 880.0
12. A surveyor drew a map of a village using a coordinate grid. The locations of two boreholes, A and B, were represented by the position vectors **a** and **b** respectively with respect to a reference point O.
Which of the following vectors is equivalent to the vector **AB**?
- A. **a – b**
B. **b – a**
C. **a + b**
D. **ab**
13. A semi-circular park with centre O has a total area of 50 m^2 . The park is divided into equal sectors, each subtending an angle of 45° at the centre.
What is the area of one of the sectors?
- A. 12.5
B. 10
C. 6.25
D. 5.5625

14. Two motorbikes, U and V, left stage O at the same time towards the same direction. The distances of the two motorbikes from O were recorded for 8 seconds. The distance-time graph of the motorbikes over the observation period is presented below.



What was the relative speed of the two motor bikes in the last 5 seconds?

- A. 4
 - B. 6
 - C. 10
 - D. 14
15. Towns X and Y are 50 km apart. A car leaves Town X towards Town Y at a speed of 60 km/h. At the same time, a lorry, which is 22.5 km ahead of the car on the road from X to Y, travels towards Town Y at an average speed of 15 km/h.

What is the distance, in kilometres, from Town Y at which the car catches up with the lorry?

- A. 18
- B. 20
- C. 30
- D. 32

16. The figure below shows two open hemispherical metal bowls A and B with radii of 10 cm and 22.5 cm. The cost of polishing the inside of each bowl is proportional to the area polished.



- Which of the following represents the ratio of the polishing charge for the smaller bowl to that of the larger bowl?
- A. 2 : 3
B. 4 : 9
C. 16 : 81
D. 64 : 729
17. The commission C , in shillings, earned by a salesperson from selling x items is modelled by a quadratic function $C = x^2 + bx + c$. When either 20 items or 25 items are sold, the salesperson earns a commission of zero.
- What are the values of b and c ?
- A. $b = -500$, $c = 45$
B. $b = 45$, $c = -500$
C. $b = -45$, $c = -500$
D. $b = -45$, $c = 500$
18. An engineer needed to find the cosine of an angle θ using a calculator whose cosine function was not working, although the other trigonometric functions were available.
- Which of the following trigonometric expressions could the engineer use to determine the value of $\cos \theta$ without using the cosine function directly?
- A. $\cos \theta = \sin (90^\circ - \theta)$
B. $\cos \theta = \sin(90^\circ + \theta)$
C. $\cos \theta = \sin (180^\circ - \theta)$
D. $\cos \theta = \frac{\tan \theta}{\sin \theta}$

19. A vertical flagpole stands on level ground, with its top 9 m above the ground. A point M on the pole is halfway between the top and the ground. From a point P on the ground, the angle of elevation to the top of the pole is 25° .

What is the angle of elevation of point M from point P?

- A. 25°
- B. 19.3°
- C. 13.1°
- D. 12.5°

20. The base of a right pyramid is a square with side length 8 cm, and its perpendicular height is 12 cm. The top of the pyramid is removed by cutting off a smaller, similar right square pyramid with base side length 4 cm, leaving a frustum.

What is the volume, in cm^3 , of the frustum of the pyramid?

- A. 128
- B. 192
- C. 224
- D. 256

Section B (60 marks)

Answer all the questions in this section in the spaces provided below each question

21. Do not use mathematical tables or calculator in this question.

A farmer has 5 litres of milk. The milk is to be packed into small containers each holding 0.731 litres.

Given that the reciprocal of 7.31 is 0.1368, determine the number of small containers that can be packed. (3 marks)

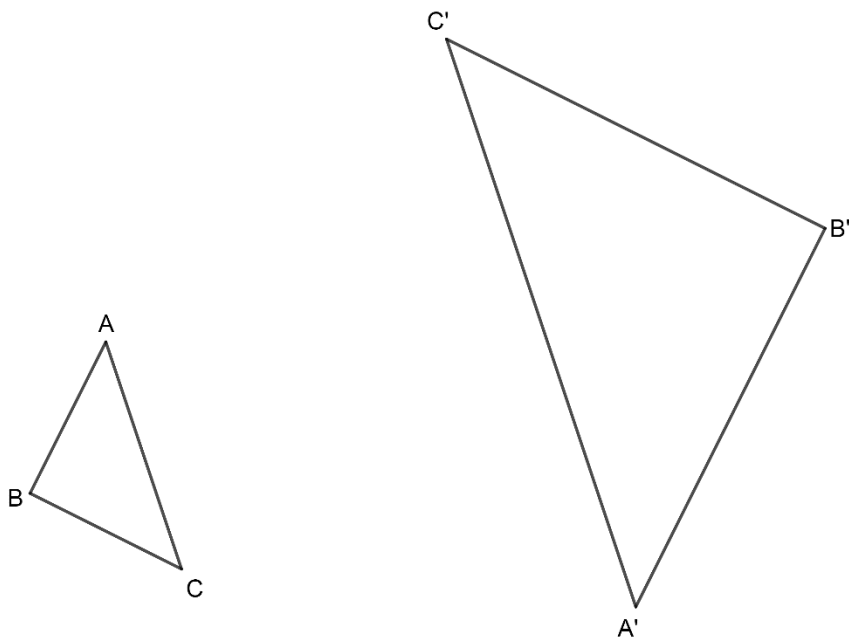
22. A women group invested some money in a bank. The value of the investment grew at an annual rate of $\sqrt[5]{71.2}$

Use logarithms, correct to 4 decimal places, to work out the annual rate of growth.

(3 marks)

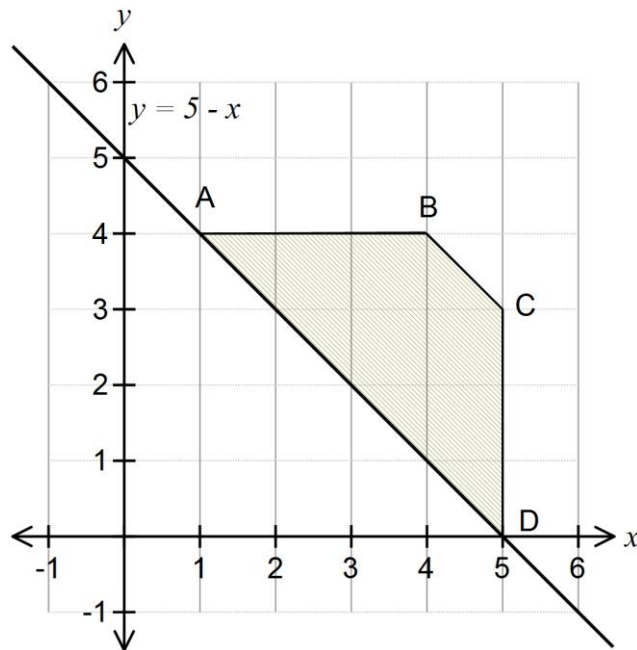
23. A square plot has a side length of 100.2 m. Determine its area by expressing 100.2 as $100 + 0.2$ and applying the quadratic identity $(a + b)^2 = a^2 + 2ab + b^2$. (3 marks)

24. On a map, a small triangular area ABC is enlarged to make it clearer. The figure below shows triangle ABC and its image triangle A'B'C', after the enlargement.



- (i) On the same diagram, locate the centre of the enlargement. Name the centre O. (2 mark)
- (ii) Determine the scale factor of the enlargement. (2 marks)

25. On the Cartesian plane below, quadrilateral ABCD forms part of a decorative floor pattern. The complete pattern is an irregular hexagon ABCDEF that is symmetrical about the line $y = 5 - x$.



Complete the decorative pattern.

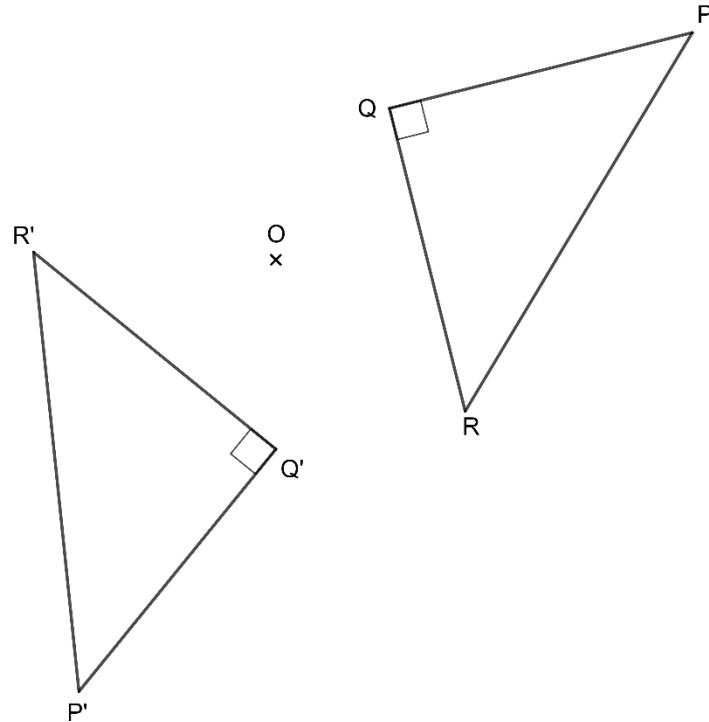
(3 marks)

26. A palm oil dealer purchased 200 litres of palm oil, which completely filled a cylindrical drum of height 90 cm. The oil was repackaged into smaller cylindrical containers similar to the drum. Each repackaged container had a height of 18 cm, was completely filled, and was sold at Ksh 50.

How much money did the dealer raise from selling all the repackaged palm oil?

(4 marks)

27. In a computer graphics application, a triangular shape PQR is rotated about a fixed point O to change its orientation on the screen. The triangular shape PQR and its rotated image triangle P'Q'R', as shown in the figure. The figure below shows triangle PQR, its image P'Q'R' after the rotation, and the centre of rotation O.



Determine the angle of the rotation.

(3 marks)

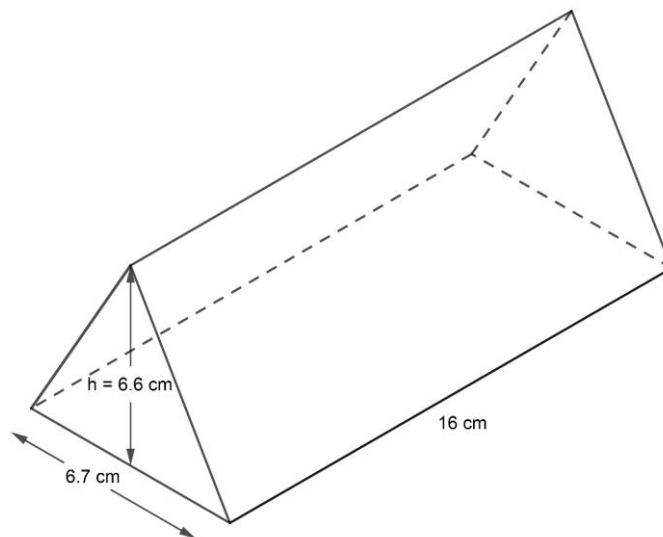
28. An observer is at the top of a vertical tower, 300 m above the ground. An airplane is flying at a constant height such that the vertical distance between the plane and the ground level is 700 m. The angle of elevation from the observer to the airplane is 65° . Find, to the nearest whole number, the horizontal distance between the base of the tower and the point directly below the plane.

(4 marks)

29. A swimming pool is designed in the shape of a regular octagon of side 5 m. When the pool is full, calculate the area of the water surface. (3 marks)

30. The radius of a circular sports field is 25 m. The sports field is surrounded by a circular jogging track of uniform width of 5 m.
Calculate the area of the jogging track. (Take $\pi = 3.142$) (3 marks)

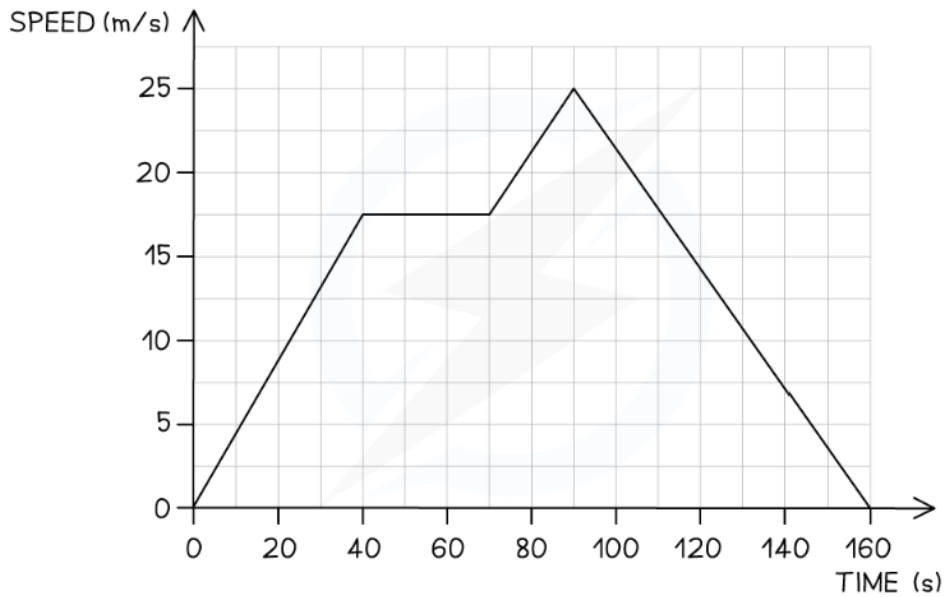
31. The diagram below shows the outline of a spectacles case in the shape of a triangular prism. The base and the height of the triangular cross section is 6.7 cm and 6.6 cm respectively.



Determine the volume of the spectacles case.

(3 marks)

32. A policeman used a speed gun to monitor the speed of a car for 160 seconds. The speed-time graph below shows the motion of the car over the monitoring period.



Use the graph to determine the;

(a) acceleration of the car in the last 70 seconds.

(2 mark)

(b) distance travelled by the car in the first 70 seconds of the monitoring.

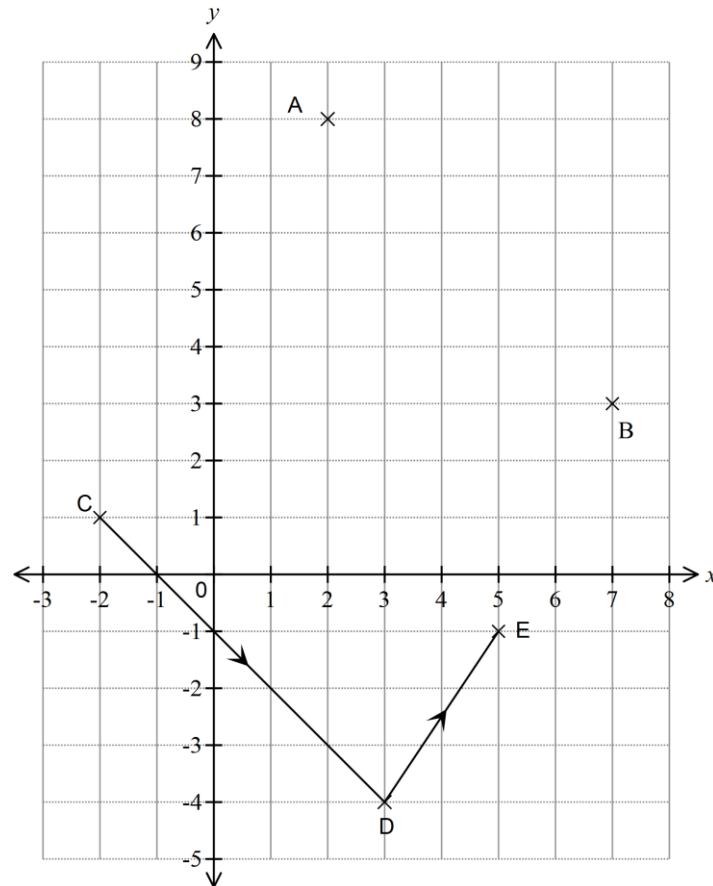
(2 marks)

33. The figure below shows three points representing pegs placed during the surveying of a farm. Point A' is the image of point A under a reflection in an unknown mirror line M . The line M has not been drawn.



- (i) Use the given information to locate and draw the mirror line **M**. (2 marks)
- (ii) Locate B' , the image of peg B under reflection in mirror M . (2 marks)
34. In a hall, seats are arranged in rows and columns. Each row contains x seats, and there are $2x$ rows altogether. The seats are aligned so that each seat is directly behind the corresponding seat in the first row. A class of 54 learners occupied the seats such that all the rows were filled except for the last three rows, which remained empty. How many chairs were there altogether in the hall? (4 marks)

35. A Cartesian coordinate system is used to map all positions on the floor of a large warehouse to assist with navigation. Each location on the warehouse floor is represented by an ordered pair (x, y) , where the coordinates are measured from a fixed reference point (the origin O). The cartesian plane below represents the warehouse. The coordinates of points A and B are $(2, 8)$ and $(7, 3)$ respectively.



- (a) Determine the coordinates of a point P, the midpoint of a straight line joining point A to point B. (2 marks)
- (b) Vectors **CD** and **DE** represent the movement of a delivery robot operating within the warehouse. Determine the magnitude of vector **CD**. (3 marks)
- (c) Express the sum of the vectors **CD** and **DE** as a column vector. (2 marks)