Ujian Akhir Sesi Akademik (UASA)

Time: 2 hours

Marks / 100

Section A [20 *marks*]

Instruction: *Answer* **all** *questions.*

1 The following shows a number sequence.

108, 36, 12, 4, ...

State the pattern of the sequence.

A Multiply the previous term by 3.

B Divide the previous term by 3.

C Divide the previous term by $\frac{1}{3}$.

D Subtract 72 from the previous term.

1.1 Understanding | Low

2 Expand the expression $-6x(y - 4)$.

A $-6xy + 4$ **C** $-6xy + 24x$

B $-6xy - 24x$ **D** $6xy - 24x$

2.1 Understanding | Low

3 Factorise completely $2m^2 - 7m - 30$.

A $(2m - 5)(m - 6)$ **C** $(2m + 5)(m + 6)$

B $(2m - 5)(m + 6)$ **D** $(2m + 5)(m - 6)$

2.2 Remembering | Medium

4 Given $p = 8x - 5y$, calculate the value of p when $x = 4$ and $y = -3$.

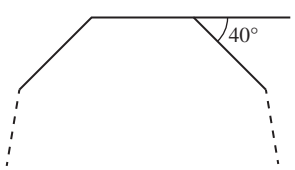
A 17 **C** 37

B 27 **D** 47

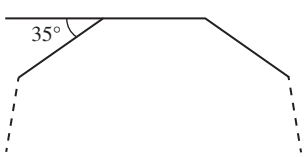
3.1 Evaluating | Low

5 HOTS Which of the following diagrams shows a regular polygon?

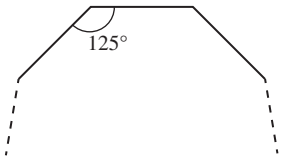
A



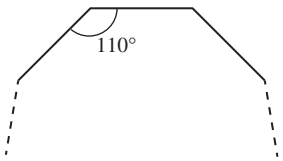
B



C

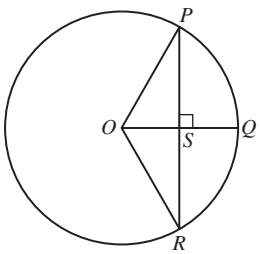


D



4.1 Analysing | High

6 The diagram below shows a circle with centre O and a radius of 13 cm.



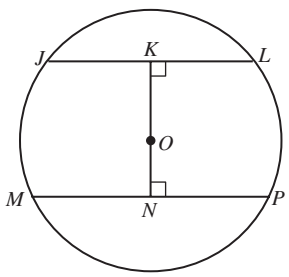
If $OS = 5$ cm, calculate the length, in cm, of the chord PSR.

A 12 **C** 24

B 18 **D** 26

5.2 Remembering | Low

7 The diagram below shows a circle with centre O and a diameter of 34 cm.



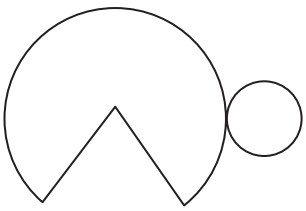
Given that $JKL = 16$ cm and $MNP = 30$ cm, calculate the length, in cm, of KON.

A 21 **C** 25
B 23 **D** 32

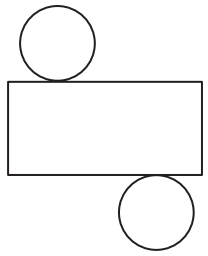
5.2 Analysing | Medium

8 Which of the following is the net of a solid cone?

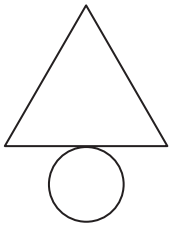
A



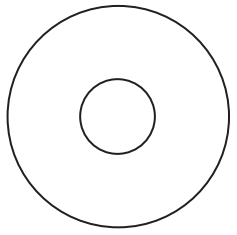
C



B

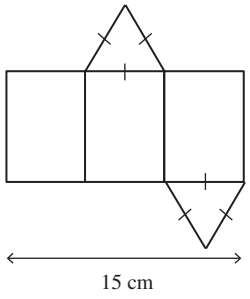


D



6.2 Remembering | Low

9 The diagram below shows the net of a three-dimensional shape. The ratio of width of the base to length of the base is 2 : 3.

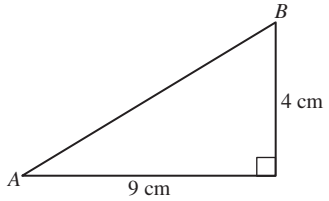


Calculate the volume, in cm^3, of the solid.

A 54.15 **C** 104.18
B 81.19 **D** 162.38

6.4 Analysing | Medium

10 The diagram below shows a triangle.



Calculate the distance, in cm, of AB.

A 9.56 **C** 9.72
B 9.65 **D** 9.85

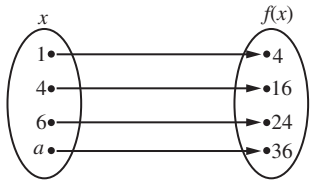
7.1 Understanding | Low

11 HOTS $PQRS$ is a rectangle with P as the origin. The coordinates of point Q and point S are (–7, 0) and (0, 10) respectively. Calculate the area, in $unit^2$, of $PQRS$.

A 35 **C** 70
B 60 **D** 80

7.3 Analysing | High

12 The diagram below shows a function.

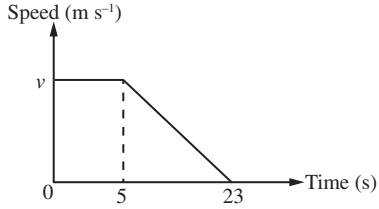


State the value of a.

A 8 **C** 10
B 9 **D** 12

8.1 Understanding | Low

13 HOTS The diagram below shows a speed-time graph for the movement of an object in 23 seconds. The deceleration of the object is 1.94 m s^{-2}.



Calculate the value of v, in m s^{-1}.

A 34.92 **C** 41.82
B 37.92 **D** 44.62

9.2 Analysing | High

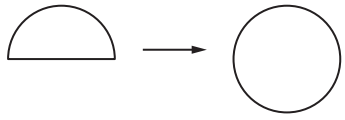
14 The gradient of a straight line joining $P(h, 8)$ and $Q(3, -4)$ is $-\frac{3}{2}$. Calculate the value of h.

A –5 **C** 3
B –4 **D** 5

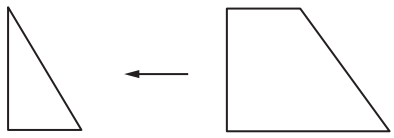
10.1 Applying | Medium

15 Which of the following shows a transformation?

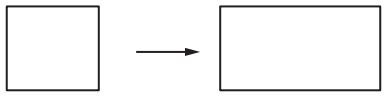
A



B



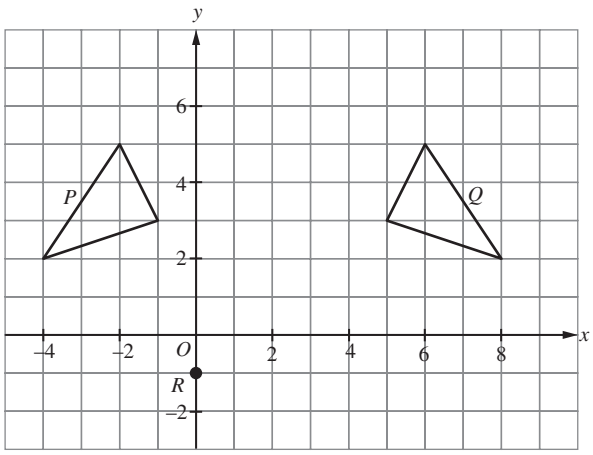
C



D

11.1 Remembering | Low

16 In the following diagram, triangle P is the image of triangle Q under a transformation.

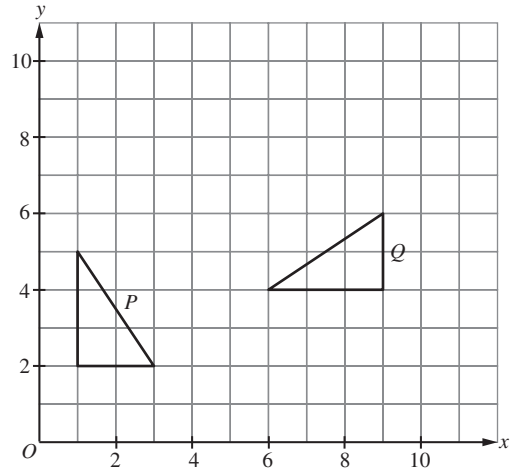


State the image of point R under the same transformation.

A (2, –1) **C** (4, –1)
B (3, –1) **D** (5, –1)

11.3 Analysing | Medium

17 HOTS In the diagram below, triangle P is the image of triangle Q under a rotation.

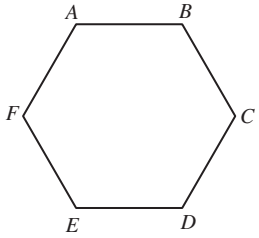


Which of the following is the description about the rotation?

A Anticlockwise rotation of 90° about the centre (4, 7)
B Anticlockwise rotation of 270° about the centre (6, 2)
C Clockwise rotation of 90° about the centre (4, 7)
D Clockwise rotation of 270° about the centre (6, 1)

11.4 Analysing | High

18 The diagram below shows a regular hexagon, $ABCDEF$.



Determine the order of clockwise rotational symmetry when the position B changes to position F.

A Order 1 **C** Order 3
B Order 2 **D** Order 4

11.6 Evaluating | Medium

19 A fair 50 sen coin is tossed for 120 times. If tails turned up 52 times, determine the experimental probability of getting a tail.

A $\frac{3}{10}$ **C** $\frac{13}{30}$
B $\frac{11}{30}$ **D** $\frac{1}{2}$

13.1 Remembering | Low

20 A bag contains 16 blue marbles and 20 green marbles. A marble is taken out at random from the bag. Calculate the probability that a blue marble is chosen.

A $\frac{4}{9}$ **C** $\frac{2}{3}$
B $\frac{5}{9}$ **D** $\frac{7}{9}$

13.4 Understanding | Low

Section B [20 *marks*]

Instruction: *Answer* **all** *questions.*

1 (a) Mark (✓) the true statements.

4.2 Remembering | Low [2 *marks*]

Answer:

(i)	The total sum of interior angles of a heptagon is 900°.	
(ii)	The regular polygon with an exterior angle of 72° is known as a hexagon.	
(iii)	The total sum of exterior angles of a polygon is 360°.	

(b) Write 'True' or 'False' for the following statements.

6.1 Understanding | Low [2 *marks*]

Answer:

	Statement	True/False
(i)	A prism has two polygons which are congruent and parallel.	
(ii)	A cylinder has two curved surfaces and one circular base.	

2 (a) The following shows a number sequence.

98, 89, 80, x, 62 , y, ...

Circle the values of x and y.

1.2 Understanding | Medium [2 *marks*]

Answer:

(i) x =	70	71	72
(ii) y =	53	54	55

(b) Match the following number sequences with the respective algebraic expressions.

HOTS 1.3 Applying | High [2 *marks*]

Answer:

(i) 20, 33, 46, 59, ...	$7 + 13n$, $n = 0, 1, 2, ...$
	$7 + 13n$, $n = 1, 2, 3, ...$
(ii) 7, 19, 39, 67, ...	$3 + 4n$, $n = 1, 2, 3, ...$
	$3 + 4n^2$, $n = 1, 2, 3, ...$

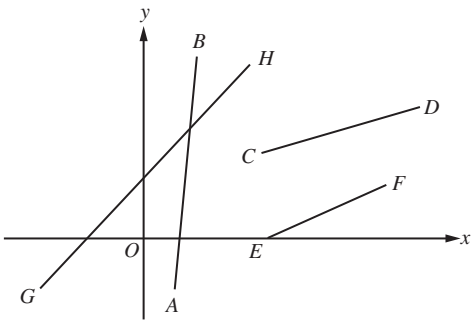
3 (a) Mark (✓) if the relation is a function and (✗) if it is not.

8.1 Understanding | Low [2 *marks*]

Answer:

(i)	{(0, 7), (2, 9), (3, 10), (5, 12)}	
(ii)	{(3, 15), (5, 15), (8, 16), (11, 44)}	

(b) The diagram below shows four straight lines on a Cartesian plane.



Arrange the straight lines in increasing order of gradients.

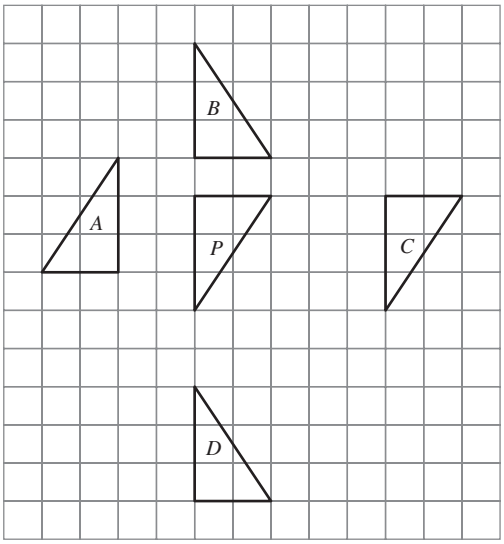
10.1 Analysing | Medium [2 *marks*]

Answer:

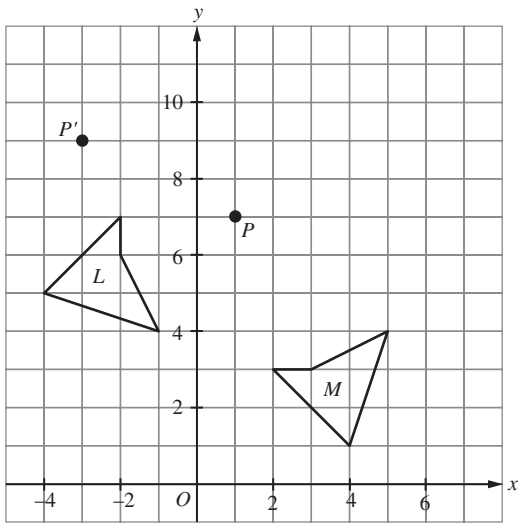
4 (a) The diagram in the answer space shows five triangles drawn on square grids. Shade the triangles that are the images of triangle *P* under certain reflections.

11.3 Applying | Medium [2 *marks*]

Answer:



(b) The Cartesian plane below shows two quadrilaterals, L and M which are congruent. P is mapped onto P' under a translation. HOTS



Underline the correct answers.

11.5 Analysing | High [2 *marks*]

Answer:

(i) The isometry of quadrilateral L to quadrilateral M is an anticlockwise rotation. The centre of rotation is point | (2, 7) | (–1, 1) |.

(ii) The coordinates of the object with the same translation as P to P' for the image (2, 1) is | (–2, –5) | (6, 1) |.

5 (a) The diagram below is a stem-and-leaf plot showing the number of pumpkins harvested in two weeks.

Number of pumpkins harvested

Stem	Leaf
2	4 6 6
3	1 2 2 2 6
4	0 3 3 4
5	2 5

Key: 2 | 4 means 24 pumpkins

Circle the correct answers.

12.1 Remembering | Low [2 *marks*]

Answer:

(i) The mode is | 26 | 32 | 43 |

(ii) The median is | 32 | 33 | 34 |

(b) The diagram below shows a set of data.

$x_1, x_2, x_3, x_4, \ldots x_n$

The mean and median of the above data are 15 and 18 respectively.
It is given that each of the data above is multiplied by 2. Fill in the correct values for the new mean and new median based on the choices of answers below.

9	15	18	30	36	60

12.1 Understanding | Low [2 *marks*]

Answer:

(i) New mean = ☐

(ii) New median = ☐

Section C [60 *marks*]

Instruction*: Answer* **all** *questions.*

1 (a) Factorise each of the following expressions.

(i) $6x - 18x^2$

(ii) $25y^2 - 81$

(iii) $2x^2 + 2xy - 7x - 7y$

2.2 Understanding | Low [3 *marks*]

Answer:

(i)

(ii)

(iii)

(b) The diagram below shows a number sequence.

24, 41, 58, 75, ...

(i) Describe the pattern for the number sequence above using algebraic expression.

1.3 Understanding | Low [2 *marks*]

(ii) Determine which term in the number sequence is 245.

1.3 Understanding | Low [2 *marks*]

Answer:

(i)

(ii)

(c) Simplify $\frac{5}{4mn} - \frac{m}{8n^2}$.

2.3 Applying | Medium [3 *marks*]

Answer:

2 (a) (i) Express a as the subject of the formula for $v = u + 4a$.

3.1 Evaluating | Low [1 *mark*]

(ii) Given $\frac{2}{5}x = \frac{3}{4}y - 3$, calculate the value of x when $y = 20$.

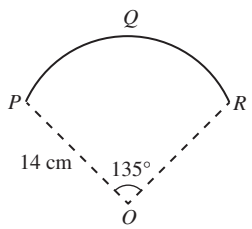
3.1 Evaluating | Low [2 *marks*]

Answer:

(i)

(ii)

(b) The diagram below shows a piece of wire which was bent to form an arc PQR. The arc subtends an angle of 135° at the centre of the circle.



(i) Given that $OP = 14$ cm, calculate the length of the wire.

5.3 Evaluating | Low [2 *marks*]

(ii) If the same wire is used to form a circle with centre S, calculate the radius, in cm, of the circle.

$\left[\text{Use } \pi = \frac{22}{7}\right]$

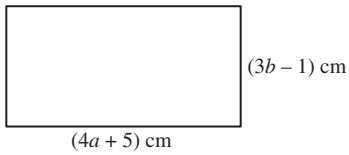
5.3 Evaluating | Medium [2 *marks*]

Answer:

(i)

(ii)

(c) The diagram below shows a rectangle.

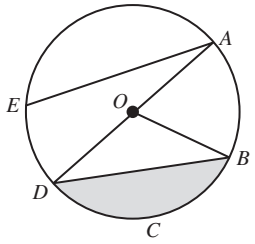


Given that the area of the rectangle is A cm^2, form the equation of A. Hence, express b as the subject of the equation.

3.1 Analysing | Low [3 *marks*]

Answer:

3 (a) The diagram below shows a circle with centre O.



Name the following parts.

5.1 Remembering | Low [3 *marks*]

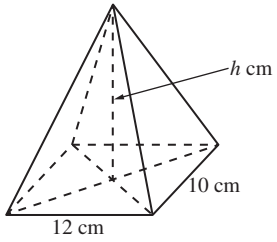
Answer:

(i) Line AE

(ii) Region $OBCD$

(iii) Shaded region BCD

(b) The diagram below shows a right pyramid with a rectangular base.

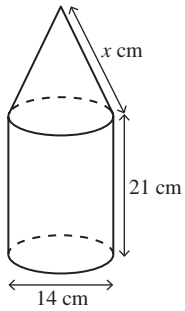


Given that the volume of the pyramid is 760 cm^3. Calculate the height, h, of the pyramid.

6.4 Applying | Low [3 *marks*]

Answer:

(c) The diagram below shows a solid made by combining a cylinder and a cone.



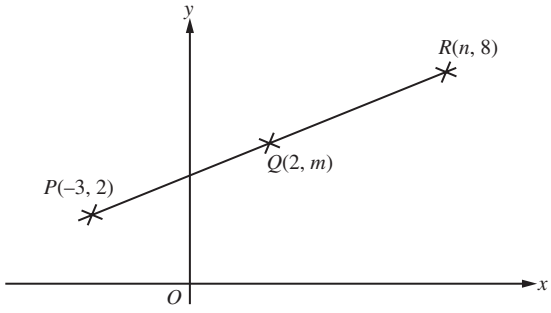
If the total surface area of the combined solid is 1 430 cm^2, calculate the length of x.

$\left[\text{Use } \pi = \frac{22}{7}\right]$

6.3 Evaluating | Medium [4 *marks*]

Answer:

4 (a) The diagram below shows a straight line PQR on a Cartesian plane.



Given that $PQ = QR$, calculate the value of m and of n.

7.2 Understanding | Low [3 *marks*]

Answer:

(b) The table below shows the values of two variables, x and y, of a function, $y = 2x^2 - 5x - 3$.

x	–1	0	1	2	3	4
y	4	–3		–5	0	9

(i) Calculate the value of y when $x = 1$.

8.2 Understanding | Medium [1 *mark*]

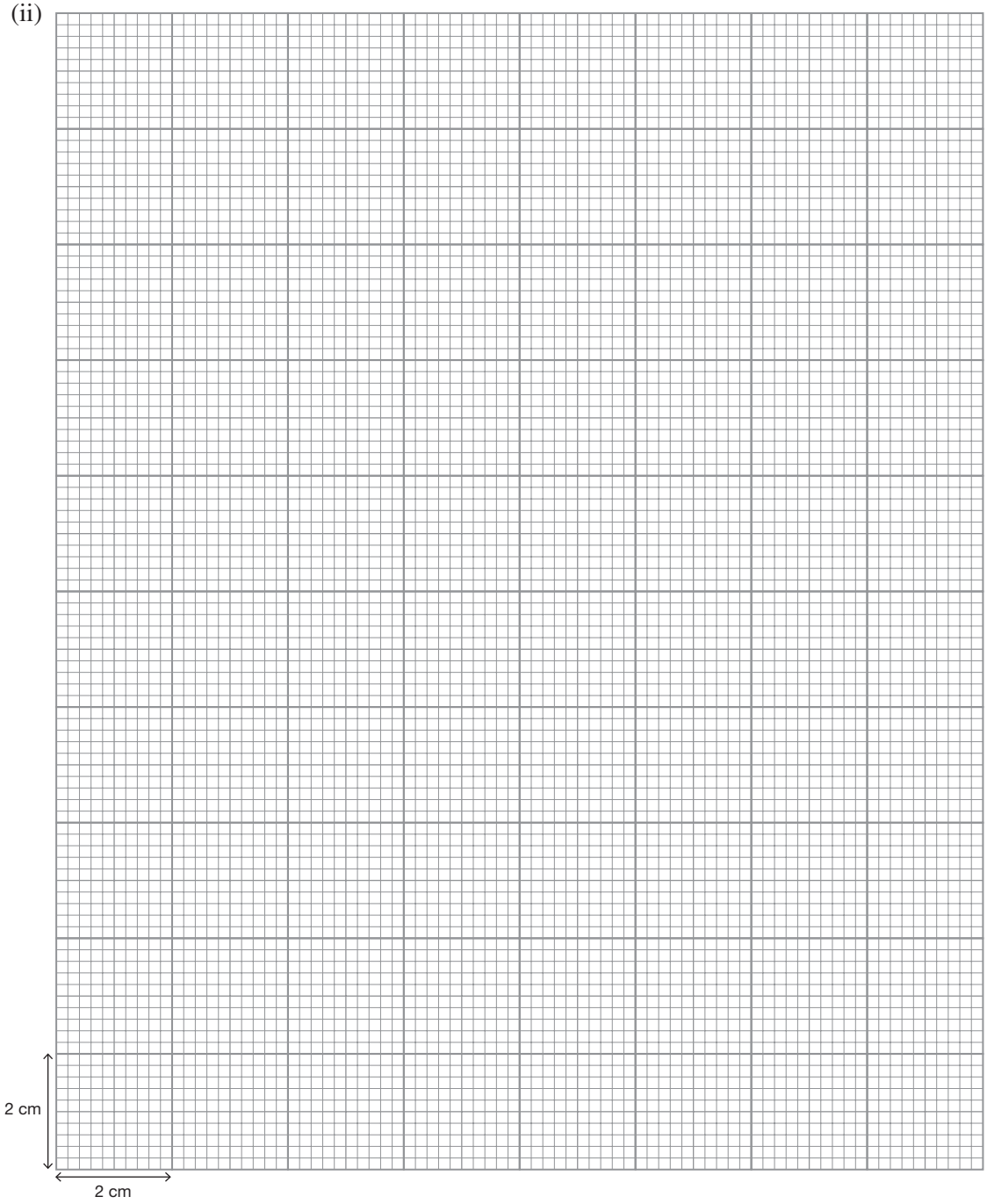
(ii) Using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 2 units on the y-axis, draw the graph of function, $y = 2x^2 - 5x - 3$ on graph grid provided in the answer space.

8.2 Applying | Medium [3 *marks*]

Answer:

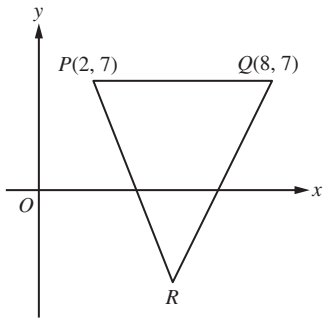
(i)

(ii)



(c) The diagram below shows an isosceles triangle PQR such that $PR = QR$ on a Cartesian plane.

HOTS



Given that the area of PQR is 33 units^2, determine the coordinates of R.

7.3 Analysing | High [3 *marks*]

Answer:

5 (a) A taxi departed from Kangar at 0935 hours and arrived at Nilai at 1705 hours. The total distance travelled for the whole journey is 540 km. Calculate the average speed of the whole journey, in km/h.

9.1 Evaluating | Low [2 *marks*]

Answer:

(b) The diagram below shows some cards in box A and box B.

Box A Box B

One card is taken out at random from box A and box B respectively. Calculate the probability of getting

(i) a vowel and a prime number.
(ii) a consonant and an even number.
(iii) a letter W and a number 4.

13.2 Applying | Low [3 *marks*]

Answer:

(i)

(ii)

(iii)

(c) The diagram in the answer space shows triangle J on a Cartesian plane.

(i) On the Cartesian plane, draw

HOTS (a) the image of triangle J under a rotation of 180^{o} about the centre (2, 6). Label the image as K.

11.4 Applying | High [2 *marks*]

(b) the image of triangle K under a translation $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$, Label the image as L.

11.2 Applying | Medium [1 *mark*]

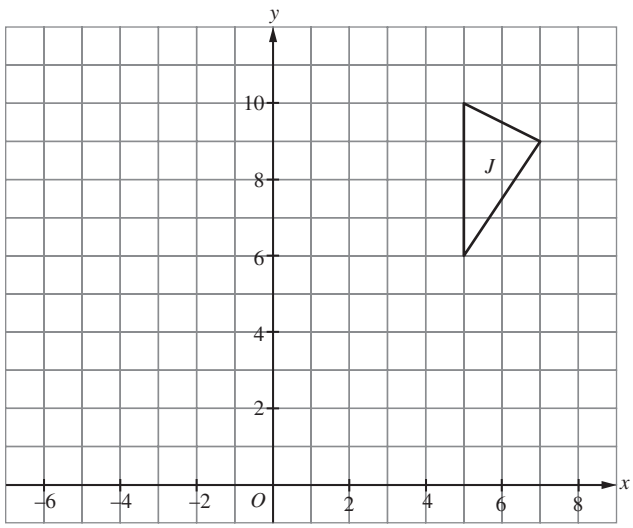
(ii) Hence, describe in full the transformation that maps triangle J onto triangle L.

HOTS

11.4 Analysing | High [2 *marks*]

Answer:

(i)



(ii)

6 (a) The table below shows the marks in a Mathematics test for a group of students.

Marks	Number of students
21 – 30	4
31 – 40	9
41 – 50	12
51 – 60	3

(i) State the modal class.

12.1 Remembering | Low [1 *mark*]

(ii) Calculate the estimated mean for the data.

12.1 Applying | Medium [3 *marks*]

(b) The table below shows the mass of old newspapers collected by 36 students.

Mass (kg)	3	6	9	12	13
Number of students	x	5	y	11	6

(i) Show that $x + y = 14$.

12.1 Evaluating | Medium [1 *mark*]

(ii) If $x = 4$,

HOTS (a) calculate the mean mass of the newspapers.

12.1 Analysing | High [3 *marks*]

(b) determine the median and the mode of the data.

12.1 Analysing | High [2 *marks*]

Answer:

(a) (i)

(ii)

(b) (i)

(ii) (a)

(b)