Summative Assessment
(*Ujian Akhir Sesi Akademik*)

Marks
100

Section A [20 *marks*]

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

Time : 2 hours

1 Given 1, 2, 3, 5, 8, m, 21, n, 55, … is a sequence. Find the values of m and n.

A $m = 11$, $n = 32$
B $m = 13$, $n = 30$
C $m = 13$, $n = 34$
D $m = 16$, $n = 37$

2 $(2k + 7)(k - 2) - (k^2 + 4k - 2) =$

A $(k - 4)(k + 3)$
B $(k + 4)(k - 3)$
C $(2k - 3)(k + 4)$
D $(2k + 3)(k - 4)$

3 $\frac{2}{r+3} - \frac{5}{3r-5} =$

A $\frac{r-5}{(r+3)(3r-5)}$

B $\frac{r-15}{(r+3)(3r-5)}$

C $\frac{r-20}{(r+3)(3r-5)}$

D $\frac{r-25}{(r+3)(3r-5)}$

4 Given that $p = \frac{2t+13}{t-8}$, express t in terms of p.

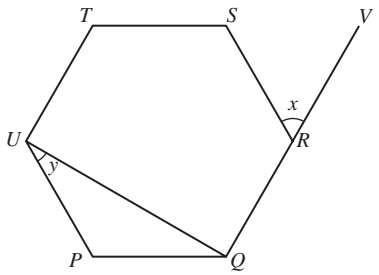
A $t = \frac{8p-13}{p-2}$

B $t = \frac{4p-13}{2-p}$

C $t = \frac{8p+13}{p-2}$

D $t = \frac{8p+13}{2-p}$

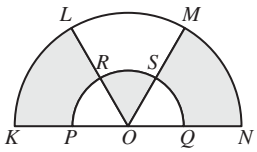
5 In the following diagram, $PQRSTU$ is a regular hexagon and QRV is a straight line.



Find the values of x and y.

A $x = 60°$, $y = 15°$
B $x = 60°$, $y = 30°$
C $x = 72°$, $y = 15°$
D $x = 72°$, $y = 30°$

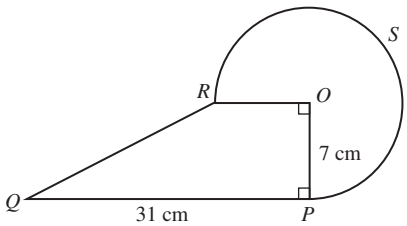
6 The diagram below shows two semicircles with common centre O. $KPOQN$ is a straight line and $KP = PO = OQ = QN = 6$ cm. The sectors OKL, OLM and OMN are of equal size.



Calculate the area, in cm^2, of the shaded region.

A 18π
B 30π
C 36π
D 42π

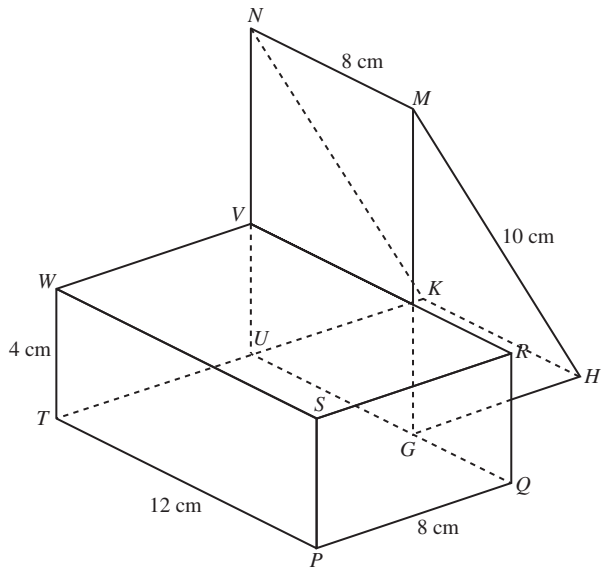
7 In the following diagram, PSR is an arc of a circle with centre O and $OPQR$ is a trapezium.



By using $\pi = \frac{22}{7}$, calculate the perimeter, in cm, of the whole diagram.

A 33
B 89
C 96
D 103

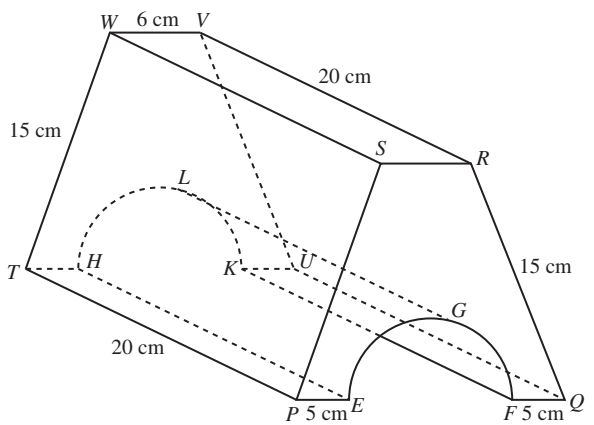
8 The diagram below shows a composite solid consisting of a cuboid and a right prism. The right prism has triangle *GHM* as its uniform cross section such that *GH* = 6 cm and *HM* = 10 cm.



Calculate the surface area, in cm^2, of the composite solid.

A 432
B 464
C 480
D 528

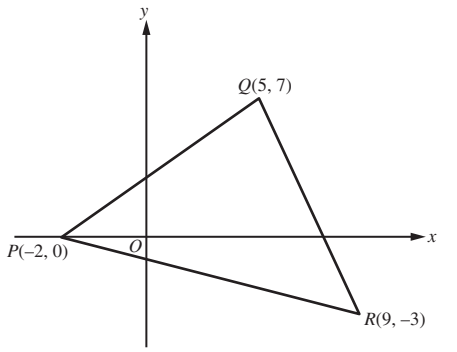
9 The following diagram shows a solid right prism with trapezium *PQRS* as its uniform cross section. A half cylinder with a diameter of 14 cm is removed from the prism.



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

A 2 010
B 2 060
C 5 140
D 5 660

10 The following diagram shows a triangle *PQR* that is drawn on a Cartesian plane. *S* is the midpoint of *QR*.



Find the coordinates of the midpoint of *PS*.

A (2, 2)
B $\left(\frac{5}{2}, 1\right)$
C $\left(\frac{5}{2}, 2\right)$
D (7, 2)

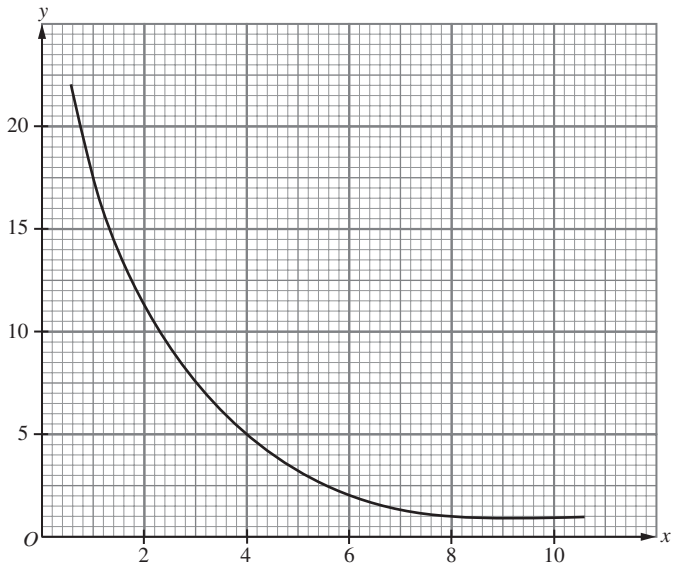
11 The following table shows some values of the variables *x* and *y* of a function.

x	–2	1	4
y	1	–2	13

Which of the following functions satisfies the ordered pairs?

A $y = x^2 - 3$
B $y = 5 - x^2$
C $y = 2x^2 - 1$
D $y = 2x^2 - 4$

12 The diagram below shows the graph of a function $y = f(x)$.



Find the value of x when $y = 12.5$.

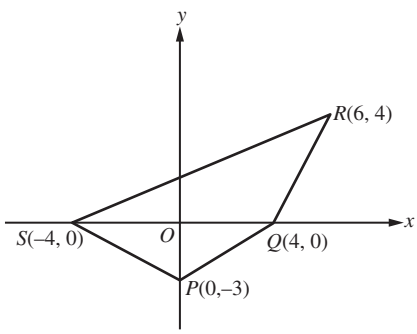
A 0.6 **C** 1.8
B 0.9 **D** 2

13 In the following diagram, P and Q are two towns whereas S is a railway station.

An electric train departed from town P at 9.00 a.m. to town Q. After travelling for $1\frac{1}{2}$ hours, the train arrived at station S. The train stopped at station S for 10 minutes before resuming its journey. The train arrived at town Q at 11.30 a.m.. Find the average speed, in km/h, of the train for its whole journey from town P to town Q.

A 78.75 **C** 85
B 84 **D** 90

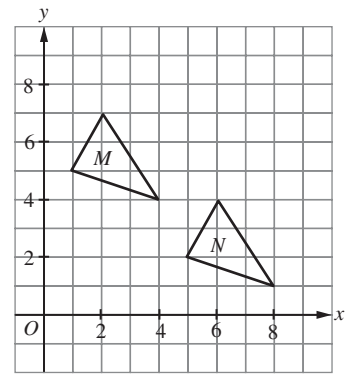
14 The diagram below shows a quadrilateral $PQRS$ drawn on a Cartesian plane.



Which of the following is **not** correct?

	Straight line	Gradient
A	PQ	$\frac{3}{4}$
B	QR	2
C	RS	$\frac{2}{5}$
D	PS	$-\frac{4}{3}$

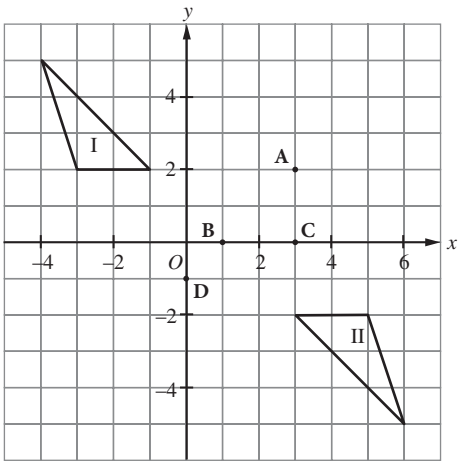
15 The following diagram shows two triangles, M and N, drawn on a Cartesian plane. Triangle M is the image of triangle N under a translation $\begin{pmatrix} p \\ q \end{pmatrix}$.



Determine the values of p and q.

A $p = -4, q = 3$ **C** $p = 4, q = -3$
B $p = 3, q = -4$ **D** $p = -3, q = 4$

16 In the following diagram, triangle I is the image of triangle II under a rotation of 180° about a certain centre.



Which of the points, **A**, **B**, **C** or **D**, is the centre of the rotation?

17 The following table shows the marks obtained by a group of students in answering a Mathematics test.

Marks	1	2	3	4	5
Number of students	2	k	4	6	2

If the modal marks is 2, find the smallest value of k.

A 5
B 6
C 7
D 8

18 The table below shows the ages of 25 patients who receive treatments at a health clinic in one morning.

Age (years)	**Frequency**
1 – 5	3
6 – 10	8
11 – 15	2
16 – 20	7
21 – 25	5

Determine the mean age, in years, of the patients.

A 11.6
B 13.6
C 15.6
D 20.0

19 The following diagram shows several number cards.

17	25	31	33	39	43	46	49	51

Ahmad chooses a card at random.
State the probability that a prime number is chosen.

A $\frac{1}{9}$
B $\frac{2}{9}$
C $\frac{1}{3}$
D $\frac{2}{3}$

20 A basket contains 10 red apples and several green apples. An apple is chosen at random from the basket. The probability of choosing a green apple is $\frac{2}{7}$. Find the number of green apples in the basket.

A 4
B 7
C 12
D 14

Section B [20 *marks*]

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

1 (a) Complete the following.

[2 *marks*]

Answer:

$7 = \square - 8 \times 1$

$-1 = \square - \square \times 2$

$-9 = \square - \square \times 3$

$-17 = \square - \square \times 4$

$\vdots$

(b) Hence, find the 25th term for the sequence 7, −1, −9, −17, ….

Mark '✓' the correct answer.

[2 *marks*]

Answer:

$\square - 125$ $\square - 155$ $\square - 185$

2 The straight line joining the points $A(1, 1)$ and $B(h, k)$ has a gradient of $\frac{1}{3}$.

(a) Mark '✓' to show the correct relation between h and k.

[2 *marks*]

Answer:

$h = 3k - 2$ ☐ $h = \frac{k+2}{3}$ ☐

(b) Circle **two** possible coordinates of point B.

[2 *marks*]

Answer:

(2, −3) (4, 2) (−5, −1)

3 (a) Mark '✓' or '✗' for the mode of the following data.

[3 *marks*]

Answer:

(i) 7, 5, 7, 3, 8, 5, 7

Mode = 7 ☐

(ii)

Score	1	2	3	4	5
Frequency	5	7	9	6	8

Mode = 3 ☐

(iii)

Stem	**Leaf**
10	5 8
20	0 4 6 6 9
30	3 5 5
40	1 3 4 4 4 7
50	6 7 8 8

10 | 5 means 10.5

Mode = 40.4 ☐

(b) 9, 15, 7, 12, 3, 7

Mark '✓' or '✗' for the given data.

[1 *mark*]

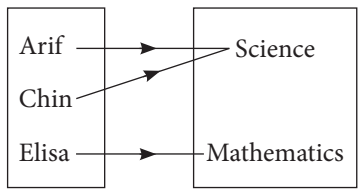
Answer:

Median = 9.5 ☐ 8 ☐ 7 ☐

4 Mark '✓' in the boxes provided.

[1 *mark*]

(a)



Answer:

Not a function ☐

One-to-one function ☐

Many-to-one function ☐

(b) {(1, 1), (3, 6), (3, 3), (7, 4)}

[1 *mark*]

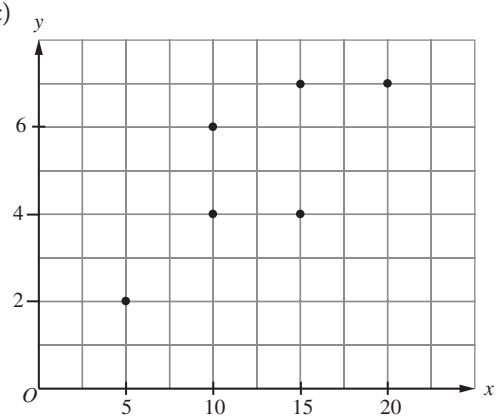
Answer:

Not a function ☐

One-to-one function ☐

Many-to-one function ☐

(c)



[2 *marks*]

Answer:

Not a function ☐

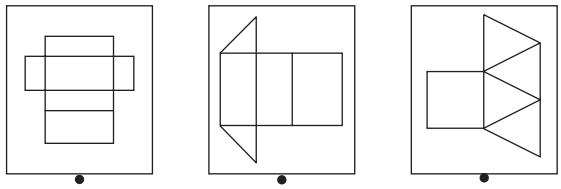
One-to-many relation ☐

Many-to-many relation ☐

5 (a) Match the nets with the name of solids.

[3 *marks*]

Answer:



Prism	Pyramid	Cuboid

(b) $(x^2 + 2)(x^2 - 2) = x^4 - 4$

Based on the information above, circle one factor of $x^4 - 4$.

[1 *mark*]

Answer:

$x + 2$ $\quad x^2 + 2$ $\quad x - 2$

Section C [60 *marks*]

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

1 (a) (i) Complete each of the following.

[2 *marks*]

Answer:

$h^2 - 2h + 1 = \left(h - \square\right)^2$

$2h^2 - 7h + 5 = \left(\square\, h - 5\right)\left(h - \square\right)$

(ii) Hence, simplify the following.

$$\frac{h^2 - 2h + 1}{2h^2 - 7h + 5}$$

[1 *mark*]

Answer:

(b) Express $\frac{6}{y} - \frac{y+5}{y(2y^2-50)}$ as a fraction in the simplest form.

[3 *marks*]

Answer:

(c) Given that $r = \sqrt{\frac{1}{2}p + 4v}$,

(i) express p in terms of r and v,

[2 *marks*]

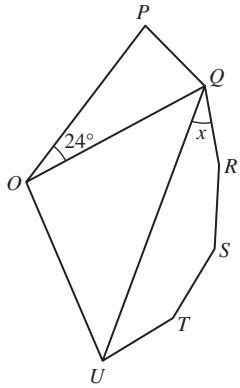
Answer:

(ii) hence, find the value of p when $r = 4$ and $v = 3\frac{1}{2}$.

[2 *marks*]

Answer:

2 (a) In the following diagram, *P, Q, R, S, T* and *U* are six vertices of a regular polygon with centre *O*.



Find

(i) the number of sides of the regular polygon,

[1 *mark*]

(ii) the value of x.

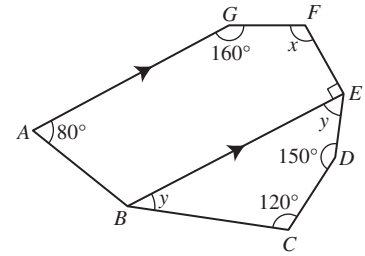
[3 *marks*]

Answer:

(i)

(ii)

(b) In the diagram below, *AG* is parallel to *BE*.

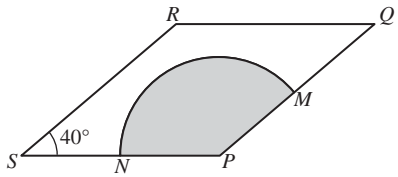


Find the values of x and y.

[3 *marks*]

Answer:

(c) The following diagram shows a piece of land in the shape of a rhombus *PQRS* with sides of length 70 m. *M* and *N* are the midpoints of *PQ* and *PS*. The shaded sector *PMN* represents a pond.

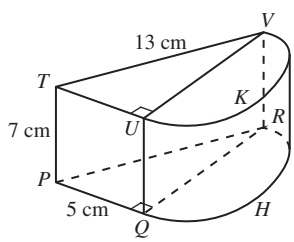


The unshaded part of the land is planted with brinjals. If the area of the rhombus *PQRS* is 3 150 m^2, find the area of the land that is planted with brinjals. $\left(\text{Use } \pi = \frac{22}{7}\right)$

[3 *marks*]

Answer:

3 (a) The diagram below shows a solid consisting of a half cylinder and a right prism that are joined on the plane *QRVU*.



Calculate

(i) the diameter of the half cylinder,

[1 *mark*]

(ii) the volume of the solid.
$\left(\text{Use } \pi = \frac{22}{7}\right)$

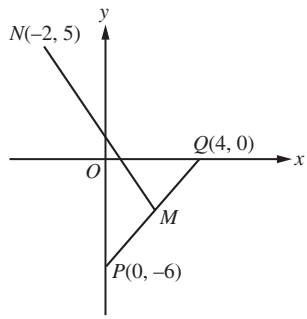
[2 *marks*]

Answer:

(i)

(ii)

(b) The following diagram shows two straight lines *PQ* and *MN* that are drawn on a Cartesian plane.



M is the midpoint of *PQ*. Find

(i) the coordinates of point *M*,

[1 *mark*]

(ii) the *y*-intercept of straight line *MN*.

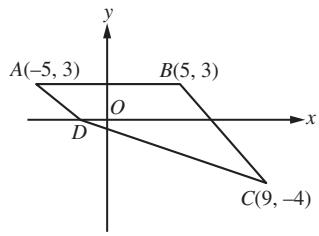
[2 *marks*]

Answer:

(i)

(ii)

(c) In the diagram below, *ABCD* is a quadrilateral that is drawn on a Cartesian plane.



Given $AB = 2AD$, find

(i) the coordinates of point *D*,

[2 *marks*]

(ii) the length of *CD*.

[2 *marks*]

Answer:

(i)

(ii)

4 (a) The following data shows the mass, in kg, of the first eight babies born at a hospital in a day.

3.08	2.94	3.22	3.06
3.03	2.85	3.14	3.08

(i) Determine the median mass of the babies.

[2 *marks*]

(ii) Another baby with a mass of 3.47 kg is born on the same day. State the effect of the delivery of this baby on the median mass of the babies born on that day.

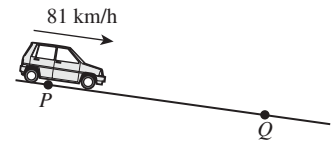
[2 *marks*]

Answer:

(i)

(ii)

(b) The following diagram shows a car descending part of a hill slope from *P* to *Q* with an acceleration of $\frac{1}{4}$ m/s^2.

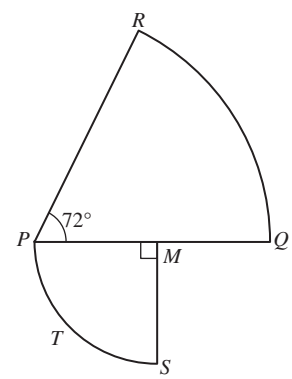


The duration of the journey from *P* to *Q* is 30 seconds. Find the speed, in km/h, of the car at *Q*.

[3 *marks*]

Answer:

(c) In the diagram below, *PQR* is a sector of a circle with radius 14 cm and centre *P*. *M* is the midpoint of *PQ*. *MPS* is a quadrant of a circle with centre at *M*.



By using $\pi = \frac{22}{7}$, calculate the perimeter of the whole diagram.

[3 *marks*]

Answer:

5 (a) In the diagram in the answer space, triangle $P'Q'R'$ is the image of triangle PQR under a clockwise rotation about the centre C.

(i) On the diagram, mark the point C.

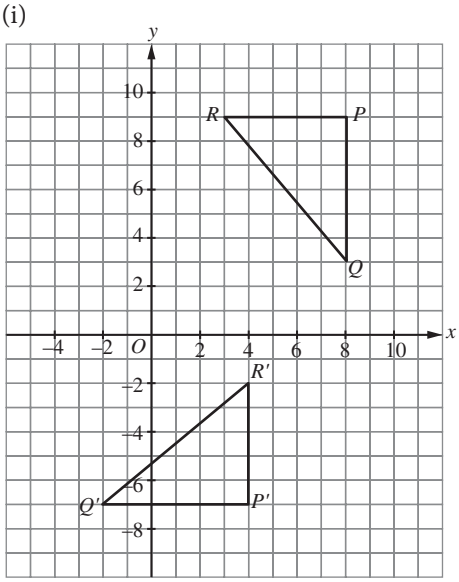
[2 *marks*]

(ii) State the angle of the rotation.

[1 *mark*]

Answer:

(i)



(ii) Angle of rotation =

(b) In the diagram in the answer space, point F is the image of point E under a translation.

(i) Describe the translation.

[1 *mark*]

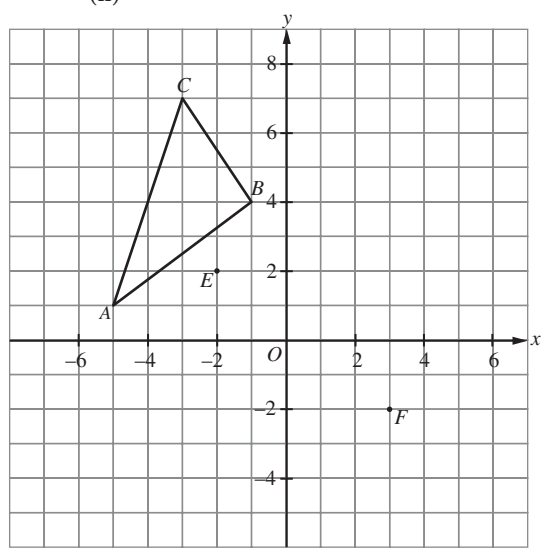
(ii) On the diagram, draw the image of triangle ABC under the same translation.

[2 *marks*]

Answer:

(i)

(ii)



(c) The table below shows some values of x and y for the function $y = x^3 - 7x + 5$.

x	−4	−3	−2	−1	0	1	2	3
y	−31	−1	11	11	5	−1	−1	11

(i) On the graph paper in the answer space, draw the graph of the function $y = x^3 - 7x + 5$.

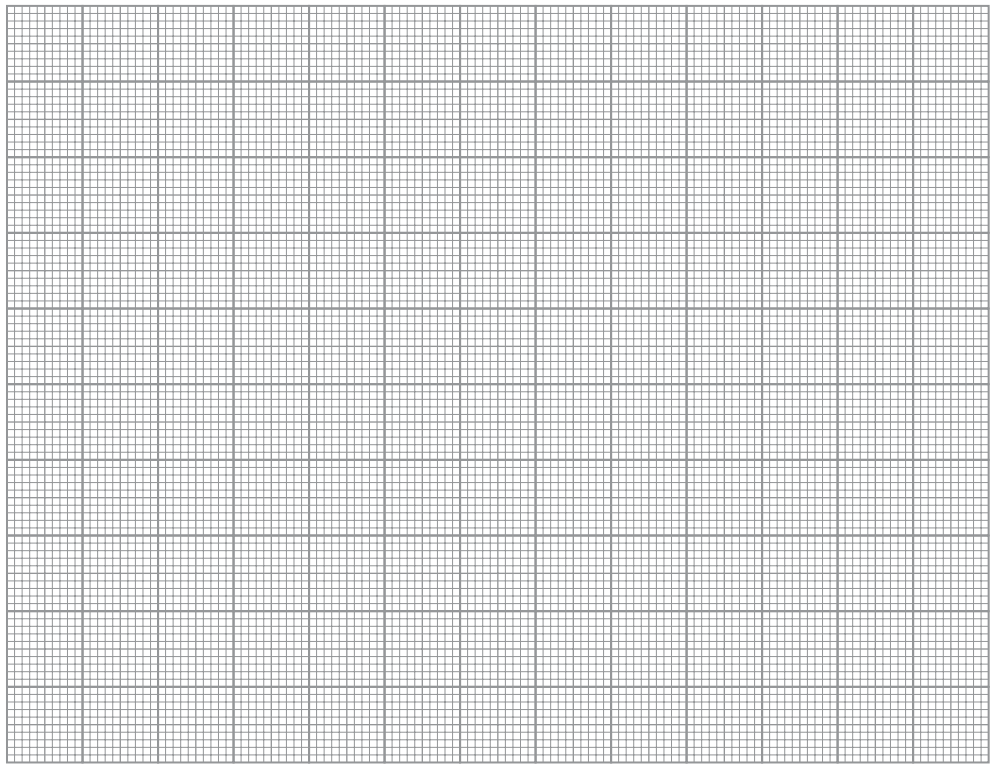
[3 *marks*]

(ii) Based on the graph in (i), find the value of 2.4^3.

[1 *mark*]

Answer:

(i)



(ii)

6 (a) A study involving 50 buildings in an area are identified. The grouped frequency table shows the number of floors for each of the building.

Number of floors	1 – 3	4 – 6	7 – 9	10 – 12	13 – 15	16 – 18
Frequency	10	9	6	15	8	2

(i) State the modal class of the data.

[1 *mark*]

(ii) Calculate the mean number of floors for the buildings in the area.

[2 *marks*]

Answer:

(i)

(ii)

(b) A number is chosen at random from the set $S = \{x : 1 \leqslant x < 30, x \text{ is an integer}\}$. Given A is the event of choosing a perfect cube and B is the event of choosing a multiple of 3. Find

(i) $P(A)$,

[1 *mark*]

(ii) $P(B')$.

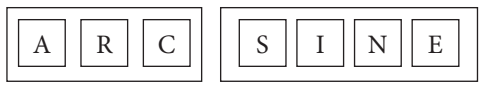
[2 *marks*]

Answer:

(i)

(ii)

(c) The following diagram shows three letter cards in box X and four letter cards in box Y.



Box X Box Y

In an activity, a card is chosen at random from box X and another card is chosen at random from box Y.

(i) Complete the sample space of the activity in the answer space.

[2 *marks*]

(ii) Find the probability that

(a) the first card that is chosen is a vowel,

[1 *mark*]

(b) at least a card that is chosen is a consonant.

[1 *mark*]

Answer:

(i) {(A, S), (A, I), (A,), (A, E),
(, S), (R,), (R, N), (, E),
(C,), (, I), (C, N), (,)}

(ii) (a)

(b)