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Answer ALL questions on the space provided.

1. (a) Express 2.73638464 to 3 significant figures.
(b) Express 0.29875 to 2 decimal places.

Answer: (a) _____ [1]

(b) _____ [1]

2. A farmer has enough food to feed 90 cows for 40 days. How many cows must he sell so that the food can feed the remaining cows for 60 days?

Answer: _____ cows [2]

3. Simplify the following and express it as a single fraction:

$$\frac{3x^2}{yz} \times \frac{6y^2}{21yz} \div \frac{3xy}{14z^2}$$

Answer: _____ [2]

4. Expand and simplify the following

(a) $(x + 3)(x - 4)$,

(b) $(2a + 3)^2$.

Answer: (a) _____ [2]

(b) _____ [1]

5. Factorise the following completely:

(a) $x^2 + 4x - 12$

(b) $2pq + 10rq + p + 5r$

(c) $4x^2 + 20x + 25$

Answer: (a) _____ [2]

(b) _____ [2]

(c) _____ [1]

6. Solve the following equations:

(a) $8h + 3(h + 1) = 6h - 7$

(b) $\frac{3x}{2} - \frac{5}{4} = \frac{2x + 3}{3}$

Answer: (a) $h =$ _____ [2]

(b) $x =$ _____ [3]

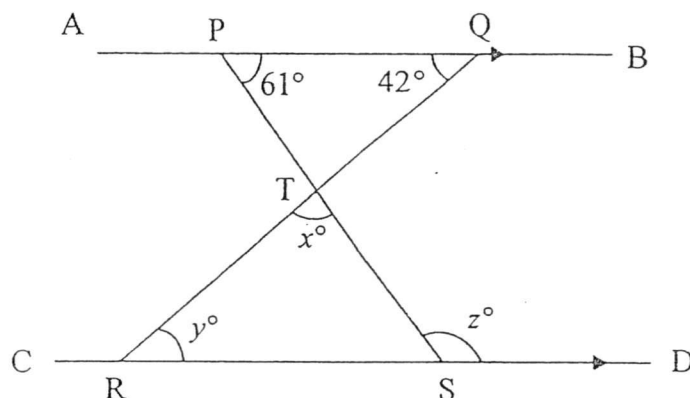
7. Solve the following simultaneous equations:

$$\begin{aligned} 3x + y &= 9 \\ 4x - 3y &= -1 \end{aligned}$$

Answer: (a) $x =$ _____

(b) $y =$ _____ [3]

8. Line AB is parallel to line CD. Line PS and line QR are straight lines intersecting at T. Find the values of x , y and z .



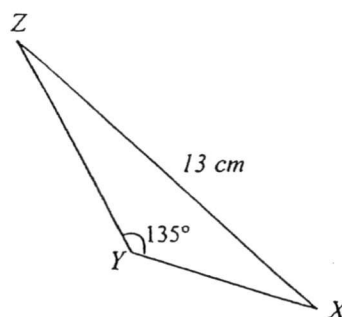
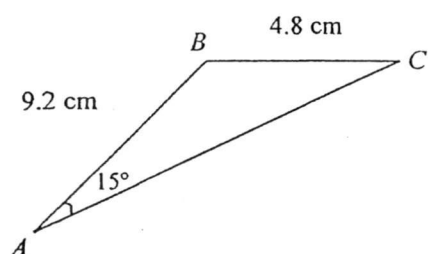
Answer: (a) $x =$ _____ $^{\circ}$ [1]

(b) $y =$ _____ $^{\circ}$ [1]

(c) $z =$ _____ $^{\circ}$ [1]

9. In the diagram, $\triangle ABC$ is congruent to $\triangle ZYX$. Find

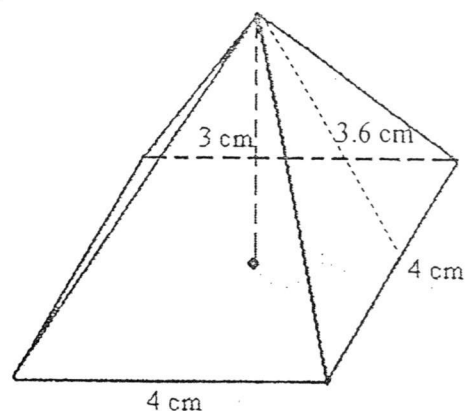
- (a) the length of YZ ,
 (b) $\angle ACB$



Answer: (a) $YZ =$ _____ cm [1]

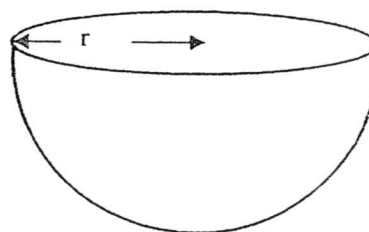
(b) $\angle ACB =$ _____ $^{\circ}$ [2]

10. (a) Find the volume of the pyramid shown below.
 (b) Find the total surface area of the pyramid.



Answer: (a) _____ cm^3 [2]
 (b) _____ cm^2 [2]

11. A hemisphere has a curved surface area of 308 cm^2 . Find the volume of the hemisphere.
 (Taking $\pi = \frac{22}{7}$)



Answer: _____ cm^3 [4]

12. A basket has 15 unique pears. Their mass in grams are:

146	168	163	175	125
123	155	138	148	168
170	162	168	158	158

- (a) In the answer space below, complete the stem and leaf diagram to represent the above information.

Stem	Leaf
12	
13	
14	
15	
16	
17	

Key: 12|3 means 123 grams

- (b) Hence, find
- the modal mass of pears,
 - the median mass of pears and
 - the mean mass of pears.

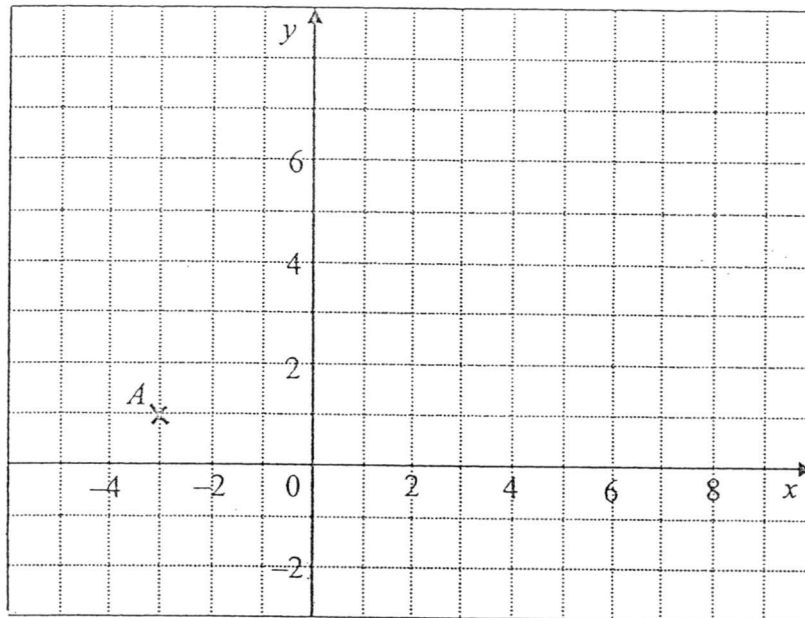
Answer: (a) *Refer to diagram* [2]

(b) (i) _____ g [1]

(ii) _____ g [1]

(iii) _____ g [2]

13. The point A is marked on the grid below.



- (a) Write down the coordinates of A .
- (b) The coordinates of point B are $(7, 6)$. Mark and label the point B on the grid.
- (c) The point $(a, 0)$ lies on the line passing through points A and B . Find the value of a .
- (d) Calculate the gradient of the line AB .

Answer: (a) $A = (\quad , \quad)$ [1]

(b) *Refer to graph* [1]

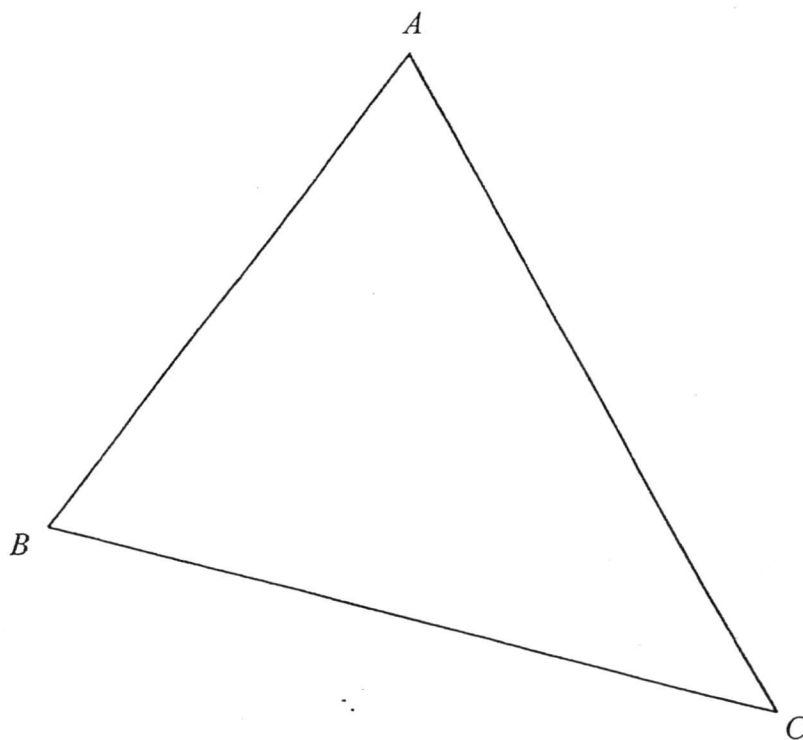
(c) $a = \quad$ [1]

(d) Gradient = $\quad$ [2]

14. A triangle $\triangle ABC$ is shown in the diagram below.

- (a) Measure and write down angle $\angle ABC$.
- (b) Construct on the diagram, using only a ruler and a compass,
 - (i) a perpendicular bisector of AB .
 - (ii) an angle bisector of $\angle BAC$.

Show all construction lines clearly



Answer: (a) $\angle ABC =$ _____ $^{\circ}$ [1]

(b) *Refer to diagram* [2]

~ End of Paper 1 ☺ ~

Mathematics Syllabus A (Paper 1)
Marking Scheme

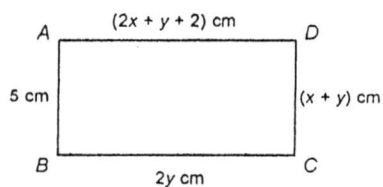
No.	Possible Answers
1	(a) 2.74 [B1] (b) 0.30 [B1]
2	40 days – 90 cows 1 day – $90 \times 40 = 3600$ cows [M1] 60 days – $3600/60 = 60$ cows Number of cows to sell = $90 - 60 = 30$ [A1]
3	$\frac{3x^2}{yz} \times \frac{6y^2}{21yz} \times \frac{14z^2}{3xy}$ [M1] $= \frac{4x}{y}$ [A1]
4	(a) $x^2 + 3x - 4x - 12$ [M1] $= x^2 - x - 12$ [A1] (b) $4a^2 + 12a + 9$ [B1]
5	(a) Cross method [M1] $(x + 6)(x - 2)$ [A1] (b) $2q(p + 5r) + (p + 5r)$ [M1] $= (2q + 1)(p + 5r)$ [A1] (c) $(2x + 5)^2$ [B1]
6	(a) $8h + 3h + 3 = 6h - 7$ [M1] $5h = -10$ $h = -2$ [A1] (b) $\frac{6x-5}{4} = \frac{2x+3}{3}$ [M1] $3(6x - 5) = 4(2x + 3)$ $18x - 15 = 8x + 12$ [M1] $10x = 27$ $x = 2.7$ [A1]

7	$y = 9 - 3x$ Sub (3) into (1): $4x - 3(9 - 3x) = -1$ [M1] $13x = 26$ $x = 2$ [A1] $y = 3$ [A1]														
8	(a) $x = 77^\circ$ [B1] (b) $y = 42^\circ$ [B1] (c) $z = 119^\circ$ [B1]														
9	(a) $YZ = 9.2$ cm (b) $ACB = 180 - 135 - 15$ [M1] $= 30^\circ$ [A1]														
10	(a) Volume = $\frac{1}{3} \times (4 \times 4) \times 3$ [M1] $= 16$ cm ³ [A1] (b) Total surface area = $(4 \times 4) + 4(0.5 \times 4 \times 3.6)$ [M1] $= 44.8$ cm ² [A1]														
11	$\frac{1}{2} \times 4 \pi r^2 = 308$ $\frac{1}{2} \times 4 \times \frac{22}{7} \times r^2 = 308$ [M1] $r = 7$ cm [A1] Volume of hemisphere = $\frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 7^3$ [M1] $= 718.6667 = 719$ cm ³ [A1]														
12	(a) <table border="1"> <thead> <tr> <th>Stem</th><th>Leaf</th></tr> </thead> <tbody> <tr> <td>12</td><td>3 5</td></tr> <tr> <td>13</td><td>8</td></tr> <tr> <td>14</td><td>6 8</td></tr> <tr> <td>15</td><td>5 8 8</td></tr> <tr> <td>16</td><td>2 3 8 8 8</td></tr> <tr> <td>17</td><td>0 5</td></tr> </tbody> </table>	Stem	Leaf	12	3 5	13	8	14	6 8	15	5 8 8	16	2 3 8 8 8	17	0 5
Stem	Leaf														
12	3 5														
13	8														
14	6 8														
15	5 8 8														
16	2 3 8 8 8														
17	0 5														

	Key: 12 3 means 123 grams (b) (i) Mode = 168g (ii) Median = 158 g (iii) Mean = $2325/15$ [M1] = 155g
13	(a) A(-3,1) [B1] (b) Refer to graph [B1] (c) $a = -5$ [B1] (d) Gradient = $(6-1)/(7-(-3))$ [M1] = 0.5 [A1]
14	(a) $ABC = 67^\circ$ (b) Refer to diagram

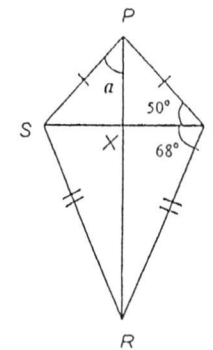
Answer **ALL** questions on the writing papers provided.

1. (a) Evaluate $\frac{99}{71} - \sqrt[3]{29}$, giving your answer correct to 2 significant figures. [1]
 (b) Find the HCF of 120 and 204. [2]
-
2. (a) Solve the inequality $3x + 5 > 20$. [1]
 (b) Hence, find the smallest
 (i) prime number that satisfies the equation. [1]
 (ii) perfect square that satisfies the equation. [1]
-
3. (a) It is given that x is directly proportional to y^2 and that $x = 12$ when $y = 2$. [2]
 (i) Find an equation relating y and x . [1]
 (ii) Find the value of y when $x = 27$. [1]
-
4. (b) It is given that p is inversely proportional to $\sqrt{q}$ and that $p = 2$ when $q = 4$. [2]
 (i) Find an equation relating p and q . [1]
 (ii) Find the value of p when $q = 25$. [1]
-
4. The scale of a Singapore map is 1 : 50 000.
 (a) Find the actual length of the Kallang-Paya Lebar Expressway (KPE) that is 18 cm long on the map. Express your answer in km. [2]
 (b) The actual area of Sentosa Island is 5 km². Calculate the area of the island on the map in cm². [2]
-
5. The diagram shows a rectangle ABCD.



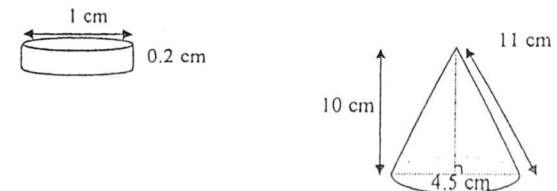
- (a) Form two simultaneous equations relating the sides of the rectangle. [2]
 (b) Solve the simultaneous equations from (a) to find the values of x and y . [3]
 (c) Hence, find the length of the rectangle. [1]

6. (a) The interior angles of a pentagon are 100° , 95° , $2x^\circ$, x° and $2x^\circ$ respectively. Find the value of x . [3]
 (b) Find the value of an exterior angle of a regular nine-sided polygon. [1]
 (c) The diagram below shows a kite PQRS.



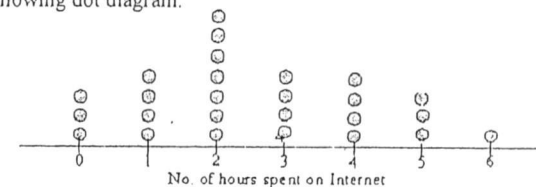
- (i) Identify and write down 1 pair of congruent triangles. [1]
 (ii) Given that $\angle PQS = 50^\circ$ and $\angle RQS = 68^\circ$, find the value of a . [2]

7. Mr Teng has 500 gold coins, 1 cm in diameter and 0.2 cm thick. He intends to make a decorative item in a conical shape of height 10 cm and diameter 4.5 cm.



- (a) How many gold coins must he melt in order to make the decorative item? [3]
 (b) He wants to have a coating all around the decorative item. Find the total surface area he needs to coat. [3]

8. (a) A group of adults was surveyed on the amount of time they spent on the Internet on a particular day. The results of the survey were represented in the following dot diagram.



Using the dot diagram, answer the following questions.

- (i) Find the modal length of time spent on the Internet. [1]
- (ii) Calculate the median length of time they spent on the Internet. [1]
- (iii) Calculate the mean length of time they spent on the Internet. [2]
- (iv) Calculate the percentage of adults who spent more than 4 hours on Internet. [2]

- (b) The table below shows the distribution of the circumference of the trees along certain stretch of road.

Calculate an estimate of the mean circumference of the trees. [2]

Circumference (cm)	Frequency
$165 < x \leq 175$	7
$175 < x \leq 185$	16
$185 < x \leq 195$	5

9. Answer the entire question on a single sheet of graph paper.

- (a) The table below shows the values of $y = 2x - 5$.

x	0	2	4
y	-5	-1	p

- (i) Calculate the value of p . [1]
- (ii) Using a scale of 2 cm to represent 1 unit on x -axis and 2 cm to represent 2 units on the y -axis, draw the graph of $y = 2x - 5$ for $0 \leq x \leq 4$. [3]

- (b) The table below shows the values of $y + 3x = 0$.

x	0	2	4
y	0	-6	-12

On the same axes, draw the graph of $y + 3x = 0$.

- (c) From the graph, find the solution to the simultaneous equations of $y = 2x - 5$ and $y + 3x = 0$. [1]

~ End of Paper 2 ☺ ~

Mathematics Syllabus A (Paper 2)
Marking Scheme

No.	Possible Answers
1	(a) -1.7 [B1] (b) Either ladder method / tree method [M1] HCF = 12 [A1]
2	(a) $x > 5$ [B1] (b) (i) Smallest prime number = 7 [B1] (ii) Smallest perfect square = 9 [B1]
3	(a) (i) $12 = k(2)^2$ $k = 3$ [M1] $x = 3y^2$ [A1] or $y^2 = 1/3x$ (ii) $y = \pm 3$ [B1] (b) (i) $2 = k/\sqrt{4}$ $k = 4$ [M1] $p = 4/\sqrt{q}$ [A1] (ii) $p = 0.8$ or $4/5$ [B1]
4	(a) 1 cm: 50 000 cm 1 cm: 0.5 km [M1] Actual length = $0.5 \times 18 = 9$ km [A1] (b) $1 \text{ cm}^2 : 0.5^2 \text{ km}^2$ $1 \text{ cm}^2 : 0.25 \text{ km}^2$ [M1] Area on map = $5 / 0.25 = 20 \text{ cm}^2$ [A1]

5	(a) $2x + y + 2 = 2y$ [B1] $x + y = 5$ [B1] (b) $x + y = 5$ ---- {1} $2x - y = -2$ --- {2} {1} + {2} : $3x = 3$ [M1] $x = 1$ [A1] $y = 4$ [A1] (c) Length = $2 \times 4 = 8$ cm [B1]
6	(a) Sum of interior angles of pentagon = $(5-2) \times 180 = 540^\circ$ [M1] $100 + 95 + 2x + x + 2x = 540$ [M1] $5x = 345$ $x = 69^\circ$ [A1] (b) Exterior angle of 9 sided polygon = $360 / 9 = 40^\circ$ [B1] (c) (i) Any congruent pairs: $SPX = QPX$, $RSX = RXQ$ [B1] (ii) $a = 180 - 90 - 50$ [M1] = 40° [A1]
7	(a) Volume of 1 gold coin = $3.142 \times 0.5^2 \times 0.2$ [M1] = 0.1570 cm^3 Volume of decorative item = $1/3 \times 3.142 \times 2.25^2 \times 10$ [M1] = 53.01 cm^3 No. of coins needed = $53.01 / 0.1570 = 338$ coins [A1] (b) Total surface area of decorative item = 3.142×2.25^2 [M1] + $3.142 \times 2.25 \times 11$ [M1] = 93.7 cm^2 [A1]
8	(a) (i) Mode = 2 hours [B1] (ii) Median = 2 hours [B1] (iii) Mean = $67/26$ [M1] = 2.58 hours [A1] (iv) Percentage of students who spent more than 4 hours = $4/26 \times 100$ [M1] = 15.4% [A1] (b) Estimate total = $(7 \times 170) + (16 \times 180) + (5 \times 190)$ [M1 – middle value] = 5020 Estimate mean = $5020 / 28$

	= 179 [A1]
9	(a) (i) $p = 3$ [B1] (ii) Correct scale [B1] Correct points [B1] Correct graph [B1] (b) Correct points [B1] Correct graph [B1] (c) $x = 1$ and $y = -3$ [B1]