Name:_____

Teacher:_____

SYDNEY TECHNICAL HIGH SCHOOL

MATHEMATICS

YEAR 8 YEARLY EXAM

2010

Time Allowed: 70 minutes

Instructions:

- Calculators may be used
- Show **all** working and answers in spaces provided

Question		Marks
A	Rates and Ratio	/16
B	Statistics	/14
C	Equations	/16
D	Area,Volume,Surface Area	/15
E	Working Mathematically	/10
	TOTAL	/71

Section A: RATES AND RATIOS – 16 marks

	Answers
1. Mrs Robinson buys flowers for $4 per bunch and sells them for $10 per bunch. What is the ratio of: (a) Cost price to selling price *(1 mark)* (b) Cost price to profit *(1 mark)*	(a) (b)
2. Simplify the following ratios (a) 112:64 *(1 mark)* (b) 4.2:1.8 *(1 mark)* (c) 3:1⅘ *(1 mark)* (d) 8ab:12bc *(1 mark)*	(a) (b) (c) (d)
3. Divide $28 in two parts in the ratio 4:3 *(1 mark)*	
4. Common brass contains copper and zinc in the ratio 3:2. How much zinc is needed with 276g of copper in order to form brass? *(1 mark)*	
5. Molly and Tom invest $6250 and $5000 in a year respectively. Their profit in the first year is $8973. If they share the profit in the same ratio as their contribution, how much profit does each one receive? *(2 marks)*	
6. A rectangular paddock is 96m long and 60m wide. What is the scale used if on a drawing the paddock is 8cm long and 5cm wide? *(2 marks)*	
7. A speedboat travels at a speed of 240km/hr. How long will it take the boat to travel 200m? *(2 marks)*	
8. The ratio of the populations of Town A and Town B is 2:3, while the ratio of the populations of Town B and Town C is 5:3. If the total population is 19278, find the population of each town. *(2 marks)*	

Section B: STATISTICS – 14 marks

	Answers

1. a) Complete the frequency distribution table.
A class of 30 students were asked how many pets they owned.

Number of Pets (x)	Tally	Frequency (f)	fx
0	𝍸		
1	𝍸 II		
2	𝍸 IIII		
3	IIII		
4	II		
5	II		
6	I		
	Total:	∑f=	∑fx=

(2 marks)

b) From the table above, calculate:

(i) Mode *(1 mark)* (i)

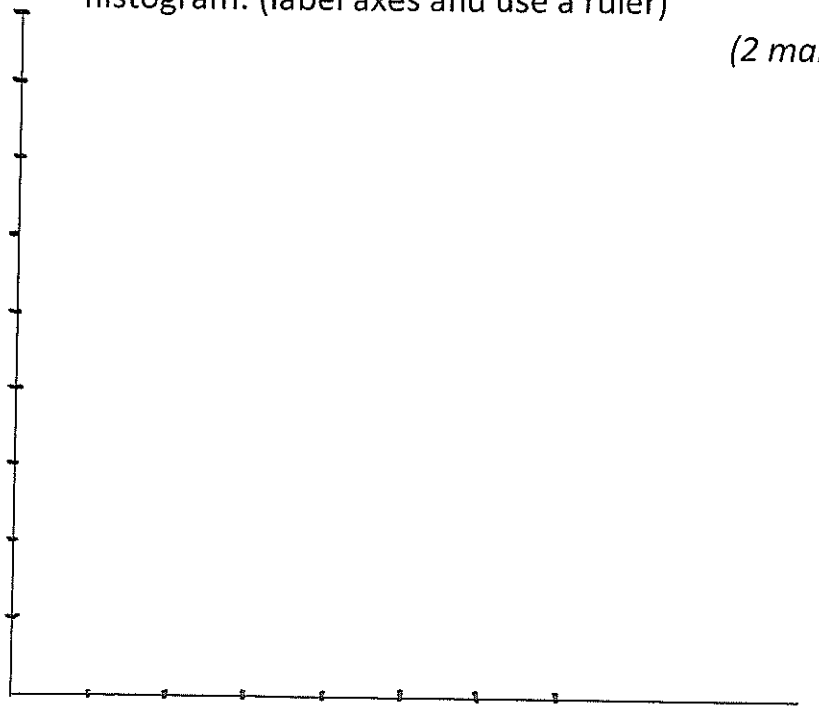
(ii) Range *(1 mark)* (ii)

(iii) Median *(1 mark)* (iii)

(iv) Mean (as a fraction) *(1 mark)* (iv)

c) Illustrate the information by drawing a frequency histogram. (label axes and use a ruler)

(2 marks)



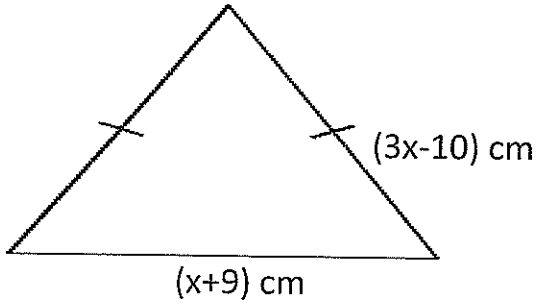
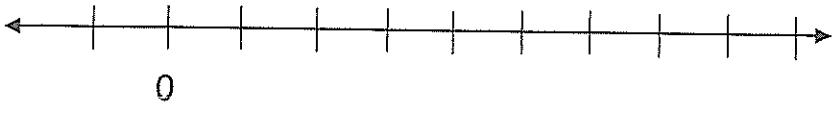
d) What percentage of students had either 2 or 3 pets?

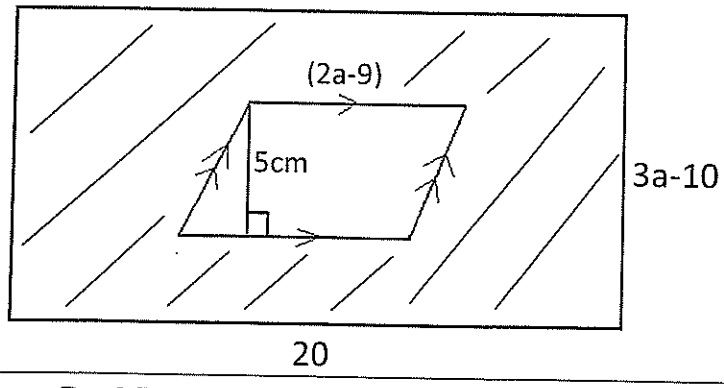
(1 mark) (d)

	Answers
2. From the Stem and Leaf Plot, find Stem | Leaf 24 | 2 7 25 | 2 4 6 6 8 26 | 0 1 3 5 9 28 | 5 6 6 8 (a) Median *(1 mark)* (b) Mode *(1 mark)* (c) Range *(1 mark)*	(a) (b) (c)
3. The mean of 5 scores is 14. A sixth score of 20 is added to the data set. What is the mean of the six scores? *(2 marks)*	

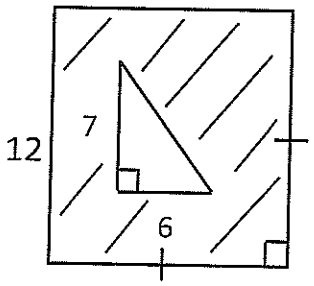
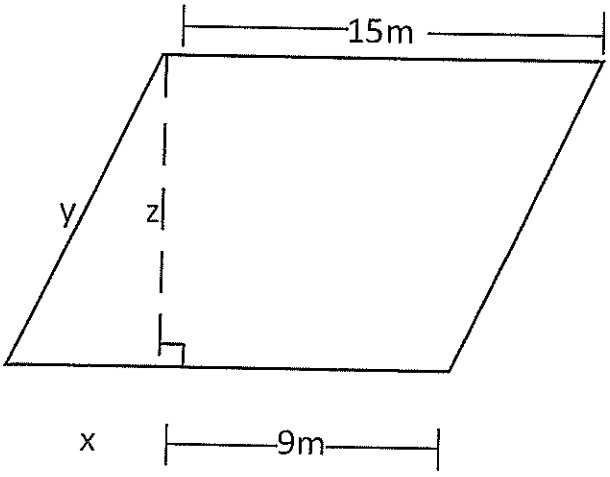
Section C: EQUATIONS – 16 marks

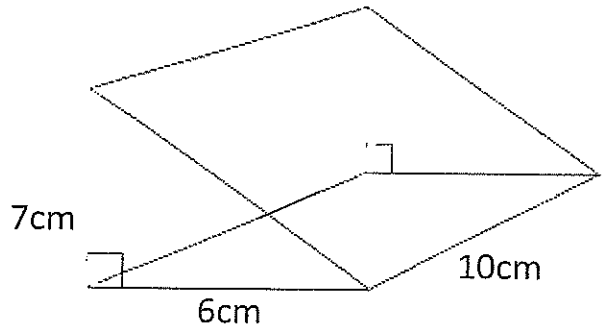
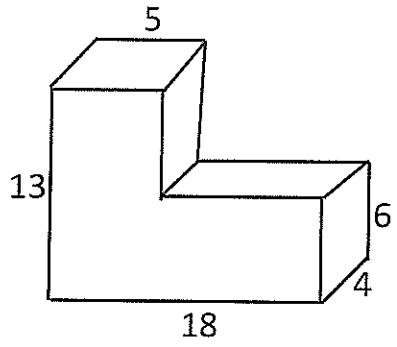
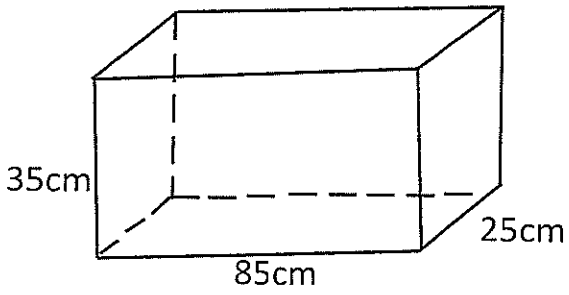
	Answers
1. Solve the following equations (a) $2p + 4 = 18$ *(1 mark)* (b) $\frac{u}{4} - 6 = 9$ *(1 mark)* (c) $7x + 8 = 5x - 12$ *(2 marks)* (d) $7(u+7) - 10u = 5(3-4u)$ *(2 marks)*	(a) .... (b) .... (c) .... (d) ....

	Answers
2. If $E = mv^2$ find the value of: (a) E when m=8 and v=3 *(1 mark)* (b) V when E = 198 and m=11 (correct to 1 dec.place where V is positive) *(1 mark)*	(a) (b)
3. The sum of 3 consecutive odd numbers in 57. Find the numbers. Show full working. *(2 marks)*	
4. Form an equation, then solve it to find the value of x *(2 marks)*  Perimeter=38cm	
5. Solve $4(9 - c) \leq 16$ and graph the solution set on the number line. *(2 marks)*  	

	Answers
6. The shaded area is $245cm^2$. Find the value of a. (All lengths are in cm) *(2 marks)* 	

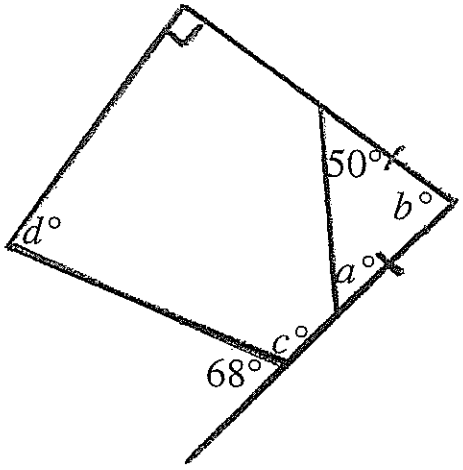
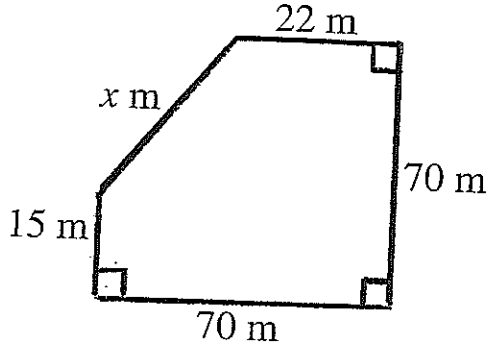
Section D: AREA, VOLUME AND SURFACE AREA – 15 marks

	Answers
1. Find the perimeter of a square whose area is $49cm^2$ *(1 mark)*	
2. Find the area of the shaded figure. (All units are in cm) *(1 mark)* 	
3.  This parallelogram has a perimeter of 50m. Find: (a) The values of x, y and z *(1 mark each)* (b) The area of the parallelogram *(1 mark)*	(a) x = y = z = (b)_____

	Answers
4. Find the volume of (a) *(2 marks)*  (All units in cm)	
(b) *(2 marks)*  	
5. A cardboard box is rectangular in shape and <u>open</u> at the top. Find the amount of cardboard used to make the box. (give your answer in m^2 to 3 dec.places) *(2 marks)*  	
6. Find the volume of a cube whose surface area is $54cm^2$ *(2 marks)*	

	Answers
7. If the side lengths of a rectangular prism are doubled, how many times greater is the volume? *(1 mark)*	

Section E: WORKING MATHEMATICALLY – 10 marks

	Answers
1. Find the value of all pronumerals, giving reasons *(1 mark each)*  NOT DRAWN TO SCALE	a = Reason: b = Reason: c = Reason: d = Reason:
2. A farmer wishes to construct a fence around a paddock with the given dimensions.  (a) Find the value of x *(1 mark)* (b) Calculate the perimeter of the paddock *(1 mark)* (c) Determine the cost of fencing the paddock if fencing materials cost $35 per metre. *(1 mark)*	(a)_____ (b)_____ _____ (c)_____ _____

	Answers
3. I have some coins in a money box, either 20 cents or 5 cents. I have 6 more 5 cent coins than 20 cent coins. My money is worth $2.55 altogether. (let x be the number of 20 cent pieces) (a) Write an expression for the number of 5 cent pieces in terms of x (1 mark) (b) Form an equation to solve and determine how many of each coin I have. (2 marks)	(a)_____ (b)

Name: SOLUTIONS

Teacher: _____

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Question		Marks
A	Rates and Ratio	/16
B	Statistics	/14
C	Equations	/16
D	Area,Volume,Surface Area	/15
E	Working Mathematically	/10
	TOTAL	/71

Section A: RATES AND RATIOS – 16 marks

	Answers
1. Mrs Robinson buys flowers for $4 per bunch and sells them for $10 per bunch. What is the ratio of: (a) Cost price to selling price *(1 mark)* (b) Cost price to profit *(1 mark)*	(a) 2 : 5 (b) 2 : 3
2. Simplify the following ratios (a) 112:64 *(1 mark)* (b) 4.2:1.8 *(1 mark)* (c) 3:1⅘ *(1 mark)* (d) 8ab:12bc *(1 mark)*	(a) 7 : 4 (b) 7 : 3 (c) 5 : 3 (d) 2a : 3c
3. Divide $28 in two parts in the ratio 4:3 *(1 mark)*	$16 : $12
4. Common brass contains copper and zinc in the ratio 3:2. How much zinc is needed with 276g of copper in order to form brass? *(1 mark)*	184g
5. Molly and Tom invest $6250 and $5000 in a year respectively. Their profit in the first year is $8973. If they share the profit in the same ratio as their contribution, how much profit does each one receive? *(2 marks)*	Ratio of investments 5 : 4 Molly receives $4985 Tom receives $3988
6. A rectangular paddock is 96m long and 60m wide. What is the scale used if on a drawing the paddock is 8cm long and 5cm wide? *(2 marks)*	1 : 1200 or 1cm : 12m
7. A speedboat travels at a speed of 240km/hr. How long will it take the boat to travel 200m? *(2 marks)*	3 secs
8. The ratio of the populations of Town A and Town B is 2:3, while the ratio of the populations of Town B and Town C is 5:3. If the total population is 19278, find the population of each town. *(2 marks)*	Town A = 5670 Town B = 8505 Town C = 5103

Section B: STATISTICS – 14 marks

Answers

1. a) Complete the frequency distribution table.
A class of 30 students were asked how many pets they owned.

Number of Pets (x)	Tally	Frequency (f)	fx
0	𝍸	5	0
1	𝍸 II	7	7
2	𝍸 IIII	9	18
3	IIII	4	12
4	II	2	8
5	II	2	10
6	I	1	6
	Total:	$\Sigma f = 30$	$\Sigma fx = 61$

(2 marks)

b) From the table above, calculate:

(i) Mode *(1 mark)* — (i) 2

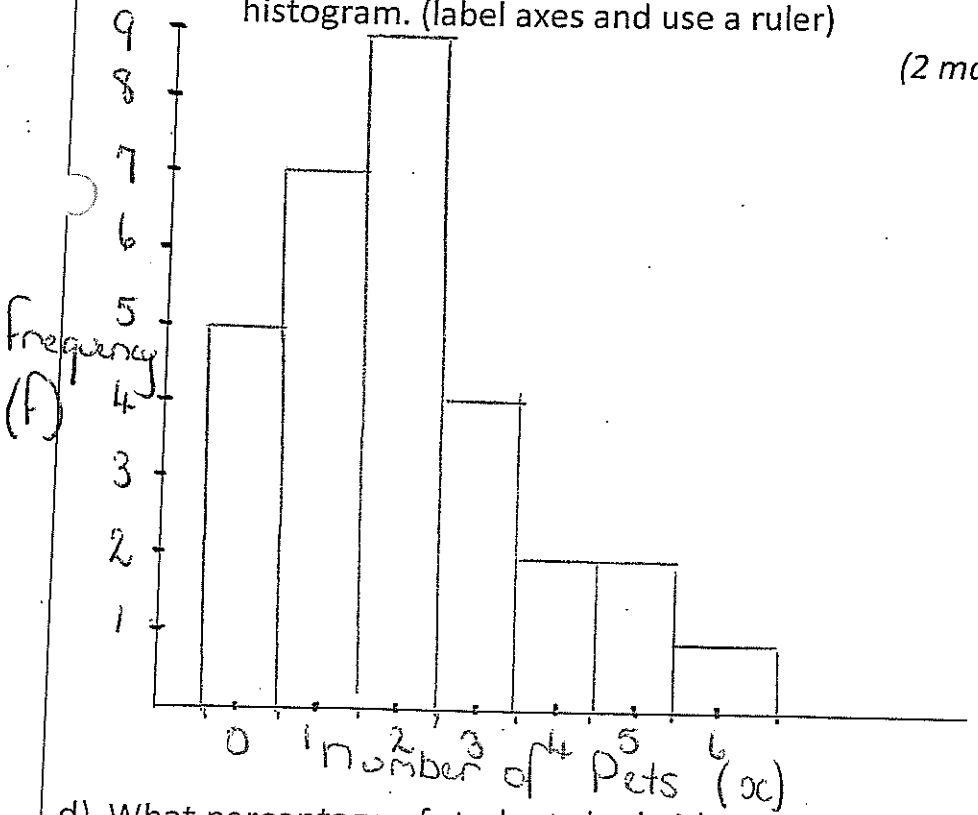
(ii) Range *(1 mark)* — (ii) 6

(iii) Median *(1 mark)* — (iii) 2

(iv) Mean (as a fraction) *(1 mark)* — (iv) $61/30 = 2\frac{1}{30}$

c) Illustrate the information by drawing a frequency histogram. (label axes and use a ruler)

(2 marks)



d) What percentage of students had either 2 or 3 pets?

(1 mark)

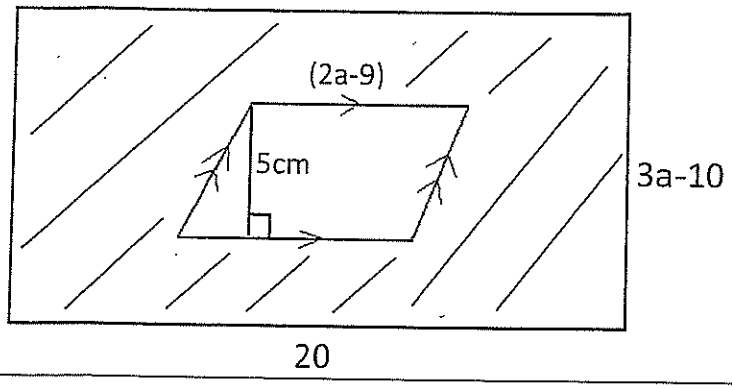
(d) $43\frac{1}{3}\%$

	Answers
2. From the Stem and Leaf Plot, find Stem | Leaf 24 | 2 7 25 | 2 4 6 6 8 26 | 0 1 3 5 9 28 | 5 6 6 8 (a) Median *(1 mark)* (b) Mode *(1 mark)* (c) Range *(1 mark)*	(a) 260 · 5 (b) 256, 286 (c) 46
3. The mean of 5 scores is 14. A sixth score of 20 is added to the data set. What is the mean of the six scores? *(2 marks)*	15

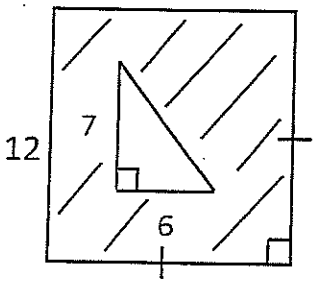
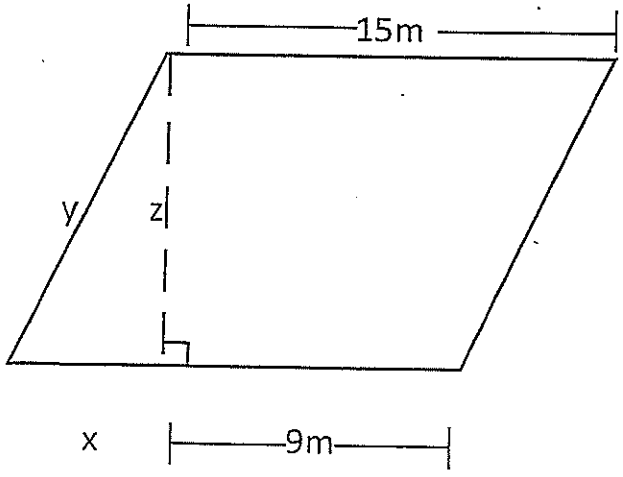
Section C: EQUATIONS – 16 marks

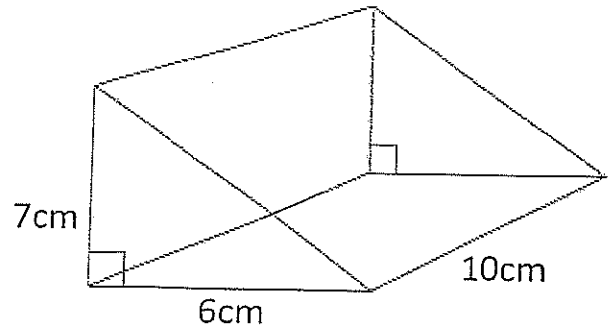
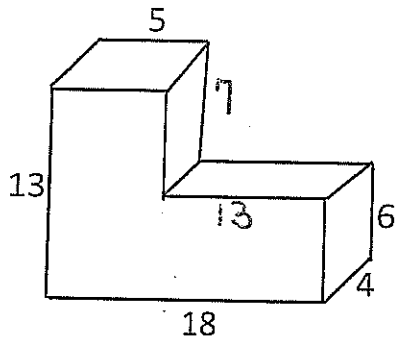
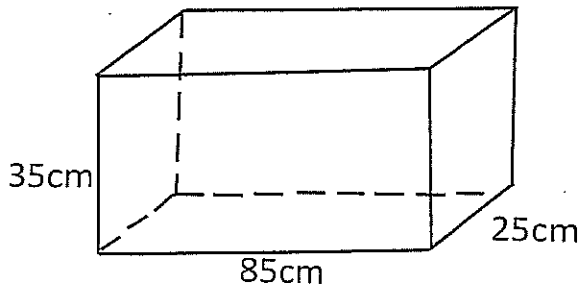
	Answers
1. Solve the following equations (a) $2p + 4 = 18$ *(1 mark)*	(a) $2p = 14$ $p = 7$
(b) $\frac{u}{4} - 6 = 9$ *(1 mark)*	(b) $\frac{u}{4} = 15$ $u = 60$
(c) $7x + 8 = 5x - 12$ *(2 marks)*	(c) $7x - 5x = -12 - 8$ $2x = -20$ $x = -10$
(d) $7(u+7) - 10u = 5(3-4u)$ *(2 marks)*	(d) $7u + 49 - 10u = 15 - 20u$ $49 - 3u = 15 - 20u$ $20u - 3u = 15 - 49$ $17u = -34$ $u = -2$

	Answers
2. If $E = mv^2$ find the value of: (a) E when m=8 and v=3 *(1 mark)* (b) V when E = 198 and m=11 (correct to 1 dec.place where V is positive) *(1 mark)*	(a) 72 (b) 4.2
3. The sum of 3 consecutive odd numbers in 57. Find the numbers. Show full working. *(2 marks)*	$n+n+2+n+4 = 57$ $3n+6 = 57$ $3n = 51$ $n = 17$ Numbers are 17, 19, 21
4. Form an equation, then solve it to find the value of x *(2 marks)* 3x-10, (3x-10) cm, (x+9) cm Perimeter=38cm	$3x-10+3x-10+x+9=38$ $7x-11=38$ $7x=49$ $x=7$
5. Solve $4(9-c) \leq 16$ and graph the solution set on the number line. *(2 marks)* 0 1 2 3 4 5 6	$36-4c \leq 16$ $-4c \leq -20$ $c \geq 5$

	Answers
6. The shaded area is $245cm^2$. Find the value of a. (All lengths are in cm) *(2 marks)* 	Rectangle = 60a-200 parm = 10a-45 Shaded = 50a-155 50a-155 = 245 50a = 400 a = 8

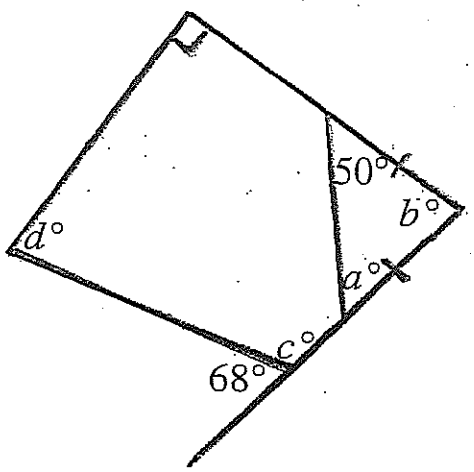
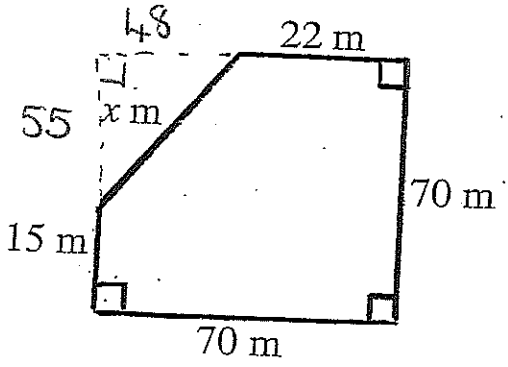
Section D: AREA, VOLUME AND SURFACE AREA – 15 marks

	Answers
1. Find the perimeter of a square whose area is $49cm^2$ *(1 mark)*	28 cm
2. Find the area of the shaded figure. (All units are in cm) *(1 mark)* 	$A = 12\times12 - \frac{1}{2}\times7\times6$ $= 123cm^2$
3.  This parallelogram has a perimeter of 50m. Find: (a) The values of x, y and z *(1 mark each)* (b) The area of the parallelogram *(1 mark)*	(a) x = 6 cm y = 10 cm z = 8 cm (b) 120 cm^2

	Answers
4. Find the volume of (a) *(2 marks)*  (All units in cm)	$V = Ah$ $= \frac{1}{2} \times 6 \times 7 \times 10$ $= 210 cm^3$
(b)  *(2 marks)*	$V = 13 \times 18 \times 4 - 7 \times 13 \times 4$ $= 572 cm^3$
5. A cardboard box is rectangular in shape and <u>open</u> at the top. Find the amount of cardboard used to make the box. (give your answer in m^2 to 3 dec.places) *(2 marks)*  	S.A $= 0.35 \times 0.85 \times 2$ $+ 0.85 \times 0.25$ $+ 0.35 \times 0.25 \times 2$ $= 0.983 m^2$
6. Find the volume of a cube whose surface area is $54cm^2$ *(2 marks)*	Area of each face $= 9cm^2$ Volume cube $= 27 cm^3$

	Answers
7. If the side lengths of a rectangular prism are doubled, how many times greater is the volume? *(1 mark)*	8

Section E: WORKING MATHEMATICALLY – 10 marks

	Answers
1. Find the value of all pronumerals, giving reasons *(1 mark each)*  NOT DRAWN TO SCALE	a = 50° Reason: angles opp equal side b = 80° Reason: angle sum of triangle c = 112° Reason: straight angle d = 78° Reason: angle sum of quad.
2. A farmer wishes to construct a fence around a paddock with the given dimensions.  (a) Find the value of x *(1 mark)* (b) Calculate the perimeter of the paddock *(1 mark)* (c) Determine the cost of fencing the paddock if fencing materials cost \$35 per metre. *(1 mark)*	(a) 73 m (b) 250 m (c) \$ 8750

	Answers
3. I have some coins in a money box, either 20 cents or 5 cents. I have 6 more 5 cent coins than 20 cent coins. My money is worth $2.55 altogether. (let x be the number of 20 cent pieces) (a) Write an expression for the number of 5 cent pieces in terms of x (1 mark) (b) Form an equation to solve and determine how many of each coin I have. (2 marks)	(a) $x+6$ (b) $20x+5(x+6)=255$ $25x+30=255$ $x=9$ $\therefore$ 9, 20 cent coins and 15, 5 cent coins