Name: ..... Teacher: .....

SYDNEY TECHNICAL HIGH SCHOOL

Year 8

Mathematics

Yearly

Part 2

October, 2015

Time Allowed: 70 Minutes

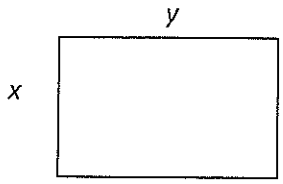
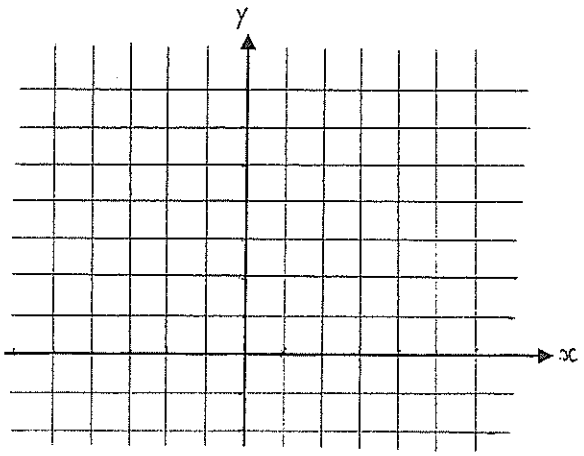
General Instructions:

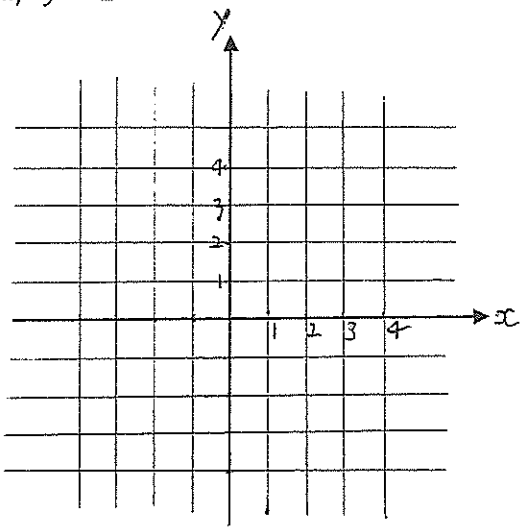
- Write using BLUE or BLACK pen only.
- Approved calculators and protractors may be used.
- Use pencil to draw or complete graphs and diagrams.
- Enter your answers in the space provided where indicated.

Sections A to E are 15 marks each

Section A	Section B	Section C	Section D	Section E	Total
/15	/15	/15	/15	/15	/75

Section A: Number, Rates and Ratio, Percentages		(15 marks)
		Answer
1.	Write 1.5% as a decimal.	
2.	Decrease $680 by 4%.	
3.	If 6% of an amount is $300, find the whole amount.	
4.	If you divide $56 in the ratio of 3:4 what is the smaller part?	
5.	A dealer bought a piano for $900 and sold it for $1200. What is the percentage profit on the selling price?	
6.	Find the simple interest on $350 for 4 years at 7.5% p.a.	
7.	A triangle has angles in the ratio of 2:3:5. Find the size of the largest angle.	
8.	An article is sold for $45. This represents a gain of 28% on the cost price. Find the cost price.	
9.	Each day 10 people take 2 hours to move a pile of sand. If only 4 people turn up for work, how long would it take them to move the same pile of sand?	
10.	A map is drawn to a scale in which 5cm represents 15km. Express this scale in the form 1 : ☐	
11.	A journey takes 6 hours if you travel at 54km/h. What time would be saved if you travelled the same journey at 81km/h?	
12.	The ratio of males to females in a club is 5:3. There are 20 males in the club. If eight new females join the club, find the new ratio of males to females.	
13.	Simplify the ratio of $18x^2y : 8xy^2$	
14.	Express 792km/h as a speed in m/s.	
15.	If you receive an 8.5% increase on your monthly wage of $1640, how much will you earn in the next year?	

Section B: Algebra and the Number Plane		(15 marks)
		Answer
1.	Simplify $3 - x - 2 + 2x + 6$	
2.	If h = -1 and g = 4-6h, find the value of g.	
3.	Expand -3(2p - 4)	
4.	Simplify $4x - \frac{10x}{5}$	
5.	If $f(x) = 4x^2$ find $f(-5\frac{1}{2})$	
6.	Factorise fully: $9x - 3x^2$	
7.	Simplify $4(x^2)^3$	
8.	 Perimeter = 30m Write a simplified expression for y in terms of x.	
9.	Simplify $\frac{3p}{4} \div \frac{p}{2}$	
10.	a) The coordinates of the points A and B are (-2, 5) and (-2, -1) respectively. Use the number plane below to help you find the distance AB.  b) Find the equation of the line passing through A and B.	a) b)

		Answer
11.	a) On the number plane below, graph the lines (i) $x + y = 4$ (ii) $y = 2$  	a)
	b) (2 marks) Find the area bounded by these 2 lines and the x and y axes (2 marks)	b)

Section C: Equations and Inequations **(15 marks)**

1. Solve (2 marks)

$6x + 5 = 13x - 9$

2. Solve (2 marks)

$\sqrt{5x - 10} = 5$

3. Solve (2 marks)

$9 - 5x > 24$

4. Solve (2 marks)

$4(x - 2) + 2(x + 5) = 14$

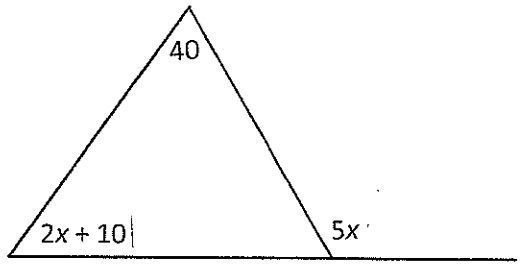
5. Solve (2 marks)

$\frac{3-2x}{5} = 4$

6. (2 marks)

If $F = 32 + \frac{9C}{5}$, find C if $F = 86$

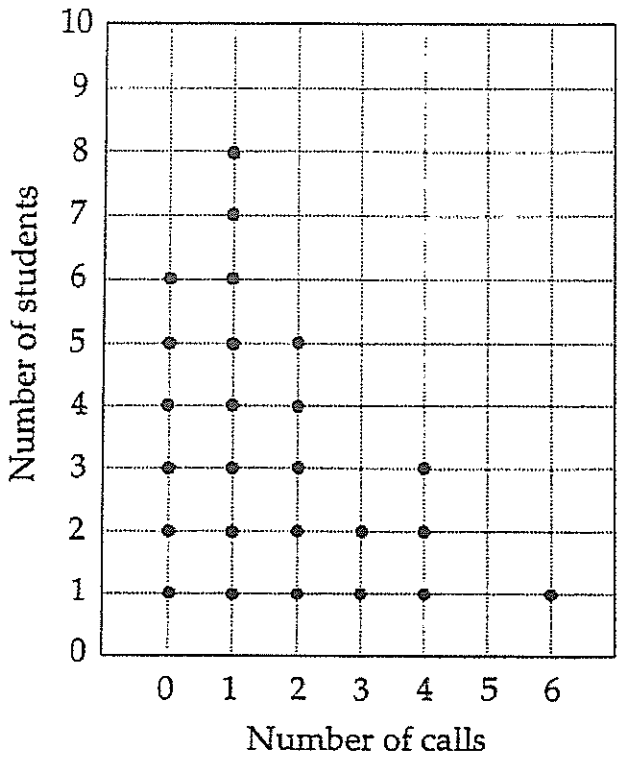
7a. (1 mark)



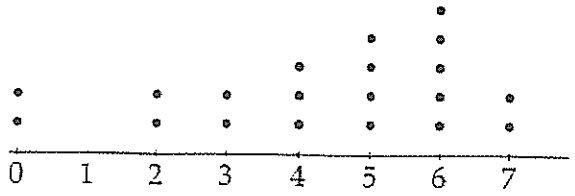
Write down an equation that could be used to find the value of x.

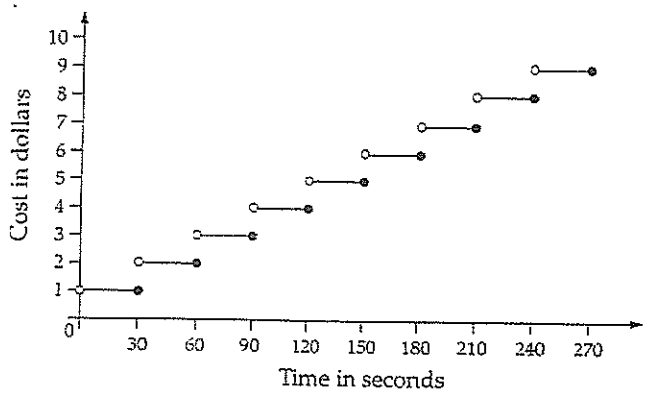
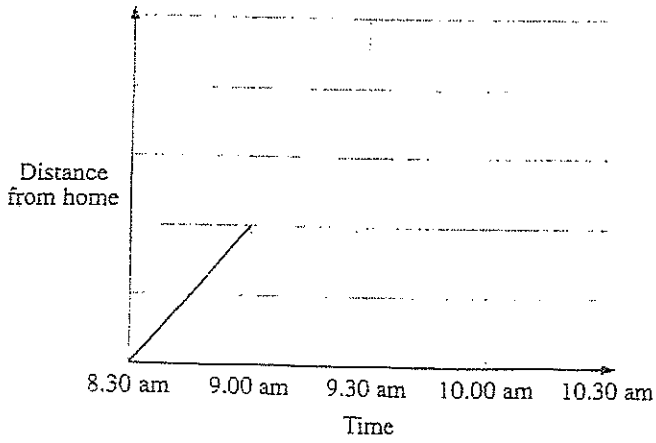
7b. (2 marks)

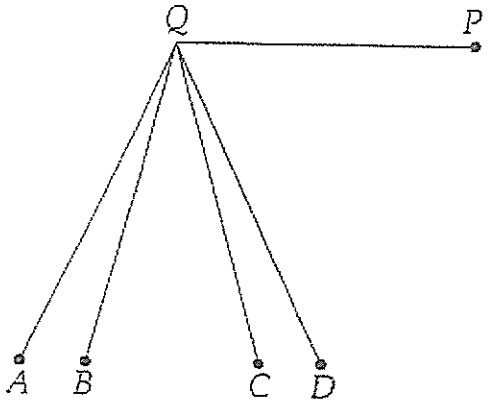
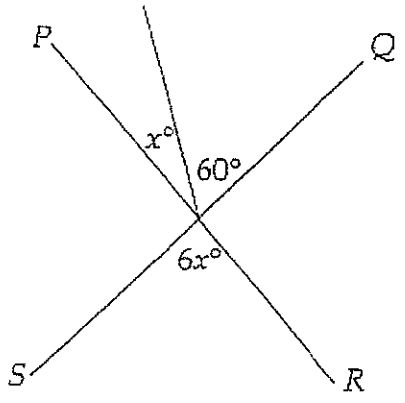
Solve your equation and find the value of x.

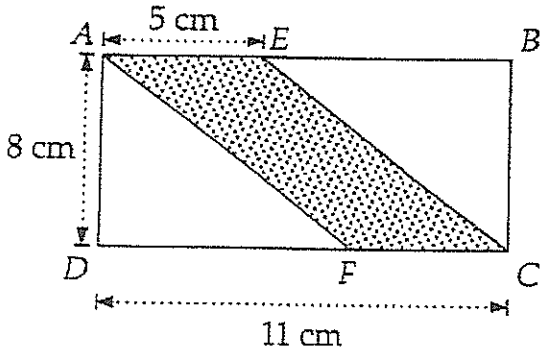
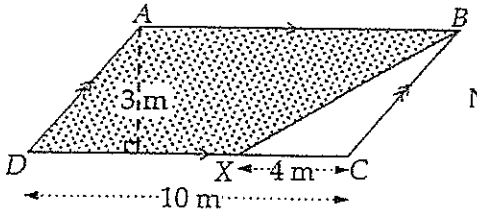
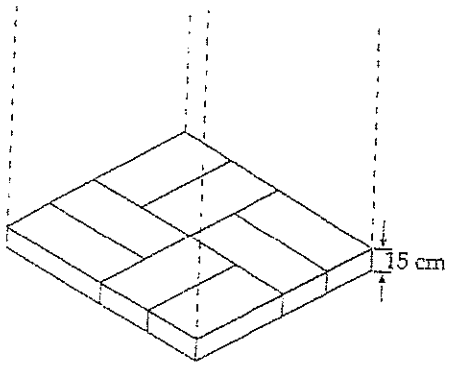
Section D: Graphs and Statistics		(15 marks)
		Answer
1.	The number of telephone calls made on Saturday by 25 students is shown in the dot plot.  Another student makes two telephone calls on Saturday. Which of the mean, median, mode or range will change if these calls are included in the diagram? (A) Mean (B) Median (C) Mode (D) Range	

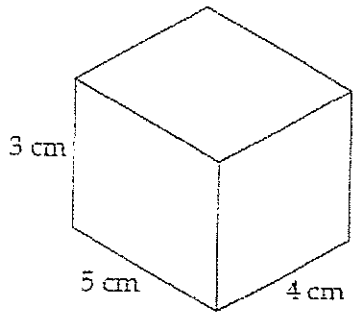
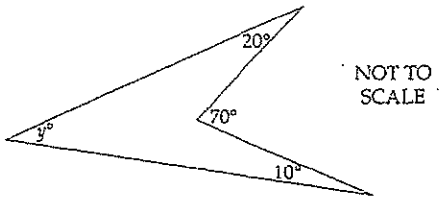
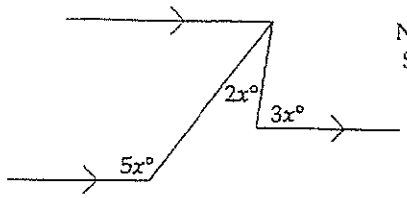
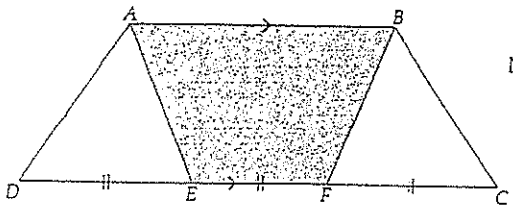
		Answer
2.	*Heights* (cm) 15 | □ 6 7 9 16 | 2 3 4 5 5 7 8 9 17 | 0 4 7 7 7 18 | 2 4 7 8 The stem-and-leaf plot shows the heights of 21 students in a class. a) One entry (represented by □) is missing. What is the missing entry if the range is 35 centimetres? b) What is the median height of these students? c) Explain why the mode is 177 centimetres.	a) b)
3.	(2 marks) Twenty people were surveyed to find the time they waited for surgery at the local hospital. The results are shown in the table. *Waiting time (months)* | *Number of people* 1 | 1 2 | 5 3 | 7 4 | 4 5 | 3 Find the *mean* waiting time.	

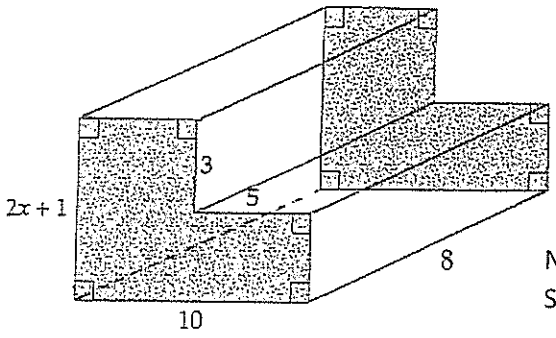
		Answer
4.	The dot plot shows the number of goals per game scored by Stephen's team during a soccer competition.  Number of goals per game	
	a) How many games did Stephen's team play?	a)
	b) What was the median number of goals scored per game?	b)
	c) What was the average number of goals scored per game, to one decimal place?	c)
	d) In what percentage of games did Stephen's team score 6 or more goals?	d)
	e) A sector graph is to be drawn to represent the above information. What angle at the centre of the graph would represent the number of times exactly 5 goals were scored?	e)

		Answer
5.	(2 marks) The step graph shows the cost of telephone calls lasting different lengths of time.  Julie makes two telephone calls, one lasting 1 minute 32 seconds and the other lasting 1 minute 5 seconds. What is the total cost of these two telephone calls?	
6.	Mario walked from home to the local shop arriving at 9.00am. He had a drink and rested for 30 minutes before returning home walking at a faster rate. Complete the diagram to make a possible travel graph of his outing.  	
7.	What new batting score must be added to 20, 18, 16, 28, 30 and 43 to increase the mean to 35?	

Section E: Measurement and Geometry		(15 marks)
		Answer
1.	 QP is one arm of a reflex angle measuring 255°. Which is the other arm of the angle?	
2.	(2 marks)  NOT TO SCALE PR and QS are straight lines. Find the value of x and give a reason.	

		Answer
3.	 NOT TO SCALE ABCD is a rectangle with length 11 centimetres and width 8 centimetres. AE = FC = 5cm. Find the perimeter, in centimetres, of the shaded part.	
4.	 NOT TO SCALE Calculate the shaded area.	
5.	 Mr Lee wishes to construct a stack of bricks 3m high. Each layer is to be like the pattern shown in the diagram. The thickness of one layer of bricks is 15cm. How many bricks does he need for the stack?	

		Answer
6.	(2 marks)  NOT TO SCALE Calculate the surface area of the rectangular prism	
7.	 NOT TO SCALE Find y	
8.	What is the value of x?  NOT TO SCALE	
9.	ABCD is a trapezium. DE = EF = FC and AB = 2 x EF  NOT TO SCALE What fraction of the trapezium is shaded?	

		Answer
10.	 NOT TO SCALE Units are in centimetres (i) (2 marks) Write a simplified expression for the area of the cross-section of this prism. (ii) (2 marks) The volume of this prism is 120cm^3. Write an equation and solve for x.	(i) (ii)

Name: ..... Teacher: .....

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Year 8
Mathematics

Yearly

Part 2

October, 2015

Time allowed: 70 minutes

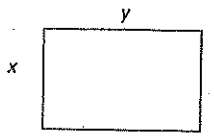
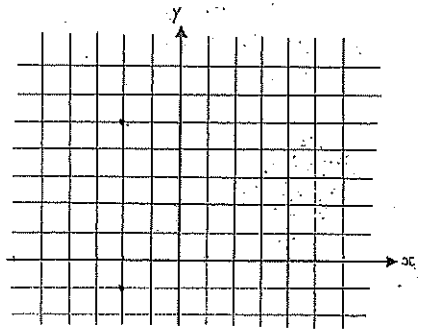
General Instructions:

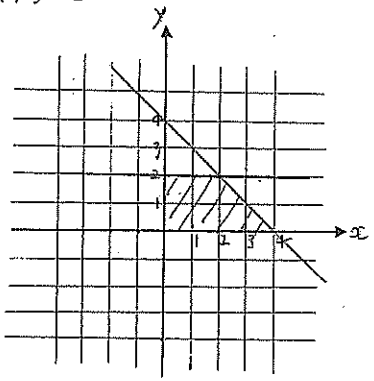
- Write using blue or black pen
- Approved calculators and protractors may be used
- Use pencil to draw or complete graphs and diagrams
- Enter your answers in the space provided where indicated.

Sections A to E are 15 marks each

Section A: Number, Rates and Ratio, Percentages (15 marks)

		Answer
1.	Write 1.5% as a decimal.	0·015
2.	Decrease $680 by 4%.	$652·80
3.	If 6% of an amount is $300, find the whole amount.	$5000
4.	If you divide $56 in the ratio of 3:4 what is the smaller part?	$24
5.	A dealer bought a piano for $900 and sold it for $1200. What is the percentage profit on the selling price?	25%
6.	Find the simple interest on $350 for 4 years at 7.5% p.a.	$105
7.	A triangle has angles in the ratio of 2:3:5. Find the size of the largest angle.	90°
8.	An article is sold for $45. This represents a gain of 28% on the cost price. Find the cost price.	$35·16
9.	Each day 10 people take 2 hours to move a pile of sand. If only 4 people turn up for work, how long would it take them to move the same pile of sand?	5 hours
10.	A map is drawn to a scale in which 5cm represents 15km. Express this scale in the form 1 : ☐	1 : 300000
11.	A journey takes 6 hours if you travel at 54km/h. What time would be saved if you travelled the same journey at 81km/h?	2 hours
12.	The ratio of males to females in a club is 5:3. There are 20 males in the club. If eight new females join the club, find the new ratio of males to females. 5 : 3 ; 20 : 12	1 : 1
13.	Simplify the ratio of $18x^2y : 8xy^2$ $\frac{18xy}{8xy^2}$	9x : 4y
14.	Express 792km/h as a speed in m/s.	220 m/s
15.	If you receive an 8.5% increase on your monthly wage of $1640, how much will you earn in the next year?	$21352·80

Section B: Algebra and the Number Plane		(15 marks)
		Answer
1.	Simplify $3-x-2+2x+6$	$x+7$
2.	If h = -1 and g = 4-6h, find the value of g.	10
3.	Expand -3(2p - 4)	$-6p+12$
4.	Simplify $4x-\frac{10x}{5}$	$2x$
5.	If $f(x)=4x^2$ find $f(-5\frac{1}{2})$	121
6.	Factorise fully: $9x-3x^2$	$3x(3-x)$
7.	Simplify $4(x^2)^3$	$4x^6$
8.	 Perimeter = 30m Write a simplified expression for y in terms of x.	$y=15-x$
9.	Simplify $\frac{3p}{4}\div\frac{p}{2}$ $\frac{3\cancel{p}}{\cancel{4}_2}\times\frac{\cancel{2}}{\cancel{p}}$	$\frac{3}{2}$ or $1\frac{1}{2}$
10.	a) The coordinates of the points A and B are (-2, 5) and (-2, -1) respectively. Use the number plane below to help you find the distance AB.  b) Find the equation of the line passing through A and B.	a) 6 units b) $x=-2$

		Answer
11.	a) On the number plane below, graph the lines (i) $x+y=4$ (ii) $y=2$  b) (2 marks) Find the area bounded by these 2 lines and the x and y axes (2 marks) $A=\frac{1}{2}(2+4)\times 2$	a) b) 6 units^2

Section C: Equations and Inequations (15 marks)

1. Solve (2 marks)

$6x + 5 = 13x - 9$

$5 = 7x - 9$

$14 = 7x$

$x = 2$

2. Solve (2 marks)

$\sqrt{5x - 10} = 5$

$5x - 10 = 25$

$5x = 35$

$x = 7$

3. Solve (2 marks)

$9 - 5x > 24$

$-5x > 15$

$x < -3$

4. Solve (2 marks)

$4(x - 2) + 2(x + 5) = 14$

$4x - 8 + 2x + 10 = 14$

$6x + 2 = 14$

$6x = 12$

$x = 2$

5. Solve (2 marks)

$\frac{3-2x}{5} = 4$

$3 - 2x = 20$

$-2x = 17$

$x = -\frac{17}{2}$ or $-8\frac{1}{2}$

6. (2 marks)

If $F = 32 + \frac{9C}{5}$, find C if $F = 86$

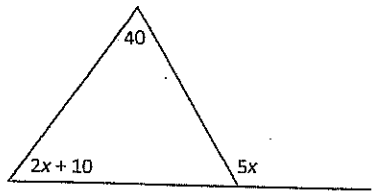
$86 = 32 + \frac{9C}{5}$

$54 = \frac{9C}{5}$

$270 = 9C$

$C = 30$

7a. (1 mark)



Write down an equation that could be used to find the value of x.

$5x = 2x + 10 + 40$

$3x = 50$

7b. (2 marks)

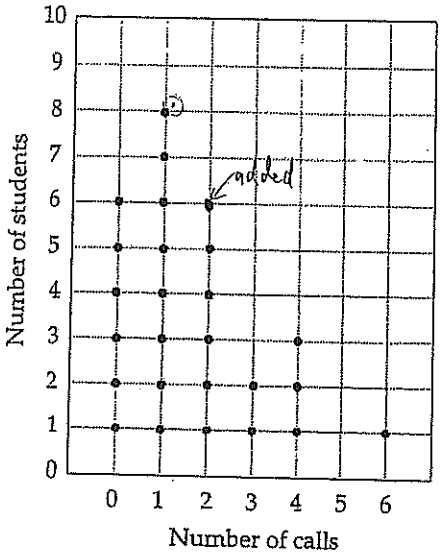
Solve your equation and find the value of x.

$5x = 2x + 10 + 40$

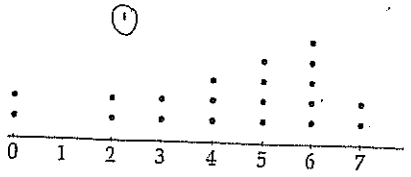
$3x = 50$

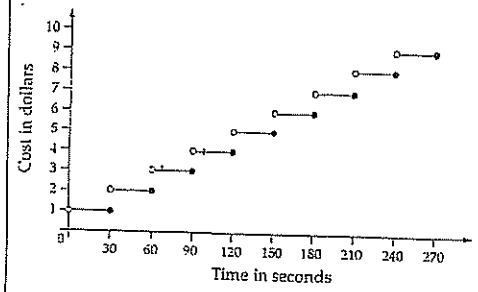
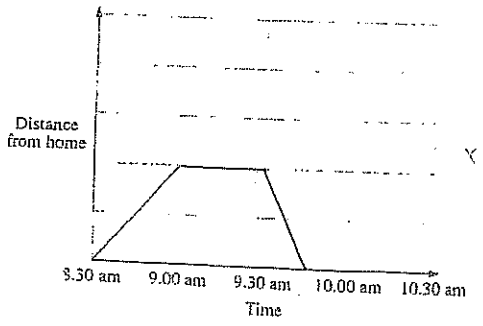
$x = 16\frac{2}{3}^{\circ}$ (-1 if they forget ° sign)

Section D: Graphs and Statistics (15 marks)

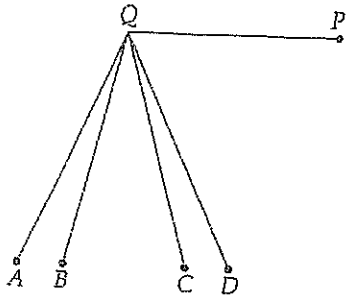
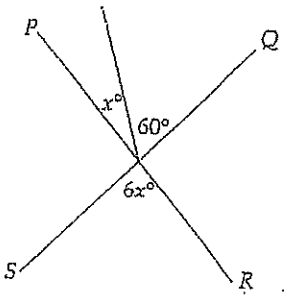
		Answer
1.	The number of telephone calls made on Saturday by 25 students is shown in the dot plot.  Another student makes two telephone calls on Saturday. Which of the mean, median, mode or range will change if these calls are included in the diagram? (A) Mean (B) ~~Median~~ (C) ~~Mode~~ (D) ~~Range~~	A) Mean

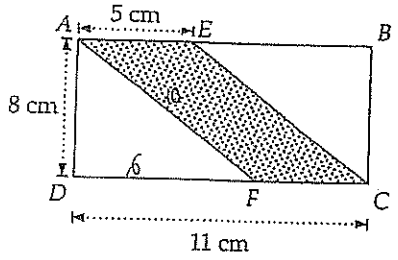
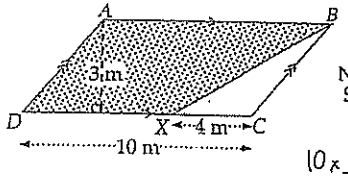
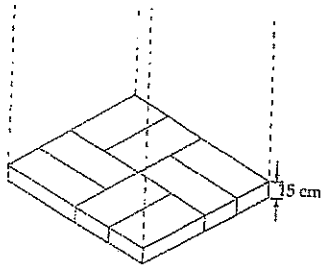
		Answer
2.	*Heights* (cm) 15 | ☐ 6 7 9 16 | 2 3 4 5 5 7 8 9 17 | 0 4 7 7 18 | 2 4 7 8 The stem-and-leaf plot shows the heights of 21 students in a class. a) One entry (represented by ☐) is missing. What is the missing entry if the range is 35 centimetres? b) What is the median height of these students? c) Explain why the mode is 177 centimetres. Score which occurs the most	188 - 153 = 35 a) 3 b) 168
3.	(2 marks) Twenty people were surveyed to find the time they waited for surgery at the local hospital. The results are shown in the table. x | f | fx *Waiting time (months)* | *Number of people* 1 | 1 | 1 2 | 5 | 10 3 | 7 | 21 4 | 4 | 16 5 | 3 | 15 20 | | 63 Find the *mean* waiting time.	$\bar{x} = \frac{63}{20}$ $= 3\frac{3}{20}$ or 3.15

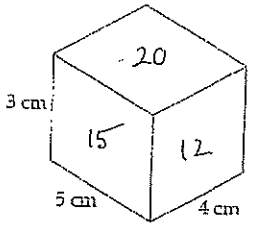
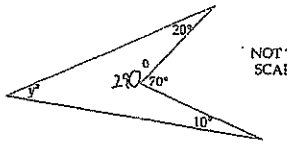
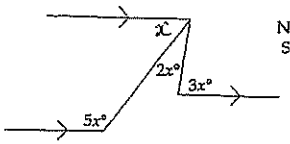
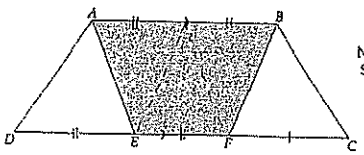
		Answer
4.	The dot plot shows the number of goals per game scored by Stephen's team during a soccer competition.  Number of goals per game a) How many games did Stephen's team play? b) What was the median number of goals scored per game? c) What was the average number of goals scored per game, to one decimal place? $\frac{0+2\times2+3\times2+4\times3+5\times4+6\times5+7\times2}{20}$ $\frac{86}{20} = 4\frac{3}{10}$ d) In what percentage of games did Stephen's team score 6 or more goals? $\frac{7}{20} \times 100$ e) A sector graph is to be drawn to represent the above information. What angle at the centre of the graph would represent the number of times exactly 5 goals were scored? $\frac{4}{20} \times \frac{360}{1}$	a) 20 b) 5 c) 4.3 d) $35\frac{6}{10}\%$ e) 72°

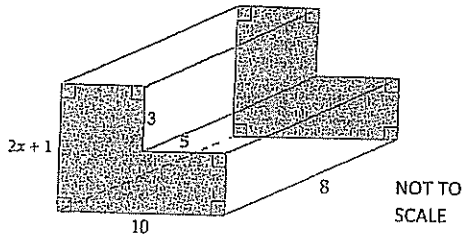
		Answer
5.	(2 marks) The step graph shows the cost of telephone calls lasting different lengths of time.  Julie makes two telephone calls, one lasting 1 minute 32 seconds and the other lasting 1 minute 5 seconds. What is the total cost of these two telephone calls?	$7
6.	Mario walked from home to the local shop arriving at 9.00am. He had a drink and rested for 30 minutes before returning home walking at a faster rate. Complete the diagram to make a possible travel graph of his outing.  	
7.	What new batting score must be added to 20, 18, 16, 28, 30 and 43 to increase the mean to 35? $245 - (20+18+16+28+30+43)$	90

Section E: Measurement and Geometry (15 marks)

		Answer
1.	 QP is one arm of a reflex angle measuring 255°. Which is the other arm of the angle?	QB
2.	(2 marks)  NOT TO SCALE PR and QS are straight lines. Find the value of x and give a reason.	$6x = x + 60$ (vertically opposite angles) $5x = 60$ $x = 12$

		Answer
3.	 NOT TO SCALE ABCD is a rectangle with length 11 centimetres and width 8 centimetres. AE = FC = 5cm. Find the perimeter, in centimetres, of the shaded part.	30 cm.
4.	 NOT TO SCALE $10\times3-\frac{1}{2}\times4\times3$ $30-6$ Calculate the shaded area.	$24m^2$
5.	 $(300\div15)\times8$ Mr Lee wishes to construct a stack of bricks 3m high. Each layer is to be like the pattern shown in the diagram. The thickness of one layer of bricks is 15cm. How many bricks does he need for the stack?	160

		Answer
6.	(2 marks) 47×2  NOT TO SCALE Calculate the surface area of the rectangular prism	$94cm^2$
7.	 NOT TO SCALE Find y	$y=40^\circ$
8.	What is the value of x?  NOT TO SCALE	$6x=180$ $x=30^\circ$
9.	ABCD is a trapezium. DE = EF = FC and AB = 2 x EF $\frac{\frac{1}{2}(x+2x)\times h}{\frac{1}{2}(3x+2x)\times h}$  NOT TO SCALE $\frac{3x}{5x}$ What fraction of the trapezium is shaded?	$\frac{3}{5}$

		Answer
10.	 NOT TO SCALE Units are in centimetres	
	(i) (2 marks) Write a simplified expression for the area of the cross-section of this prism. $10(2x+1)-15$ $20x+10-15$	(i) $20x-5$
	(ii) (2 marks) The volume of this prism is $120cm^3$. Write an equation and solve for x. $8(20x-5)=120$ $20x-5=15$ $20x=20$ $x=1$	(ii) $x=1$ cm.