Name: ..... Maths Class: File

SYDNEY TECHNICAL HIGH SCHOOL

Year 8
Mathematics

Common Test 2

August 2017

Time allowed: 70 minutes

General Instructions:

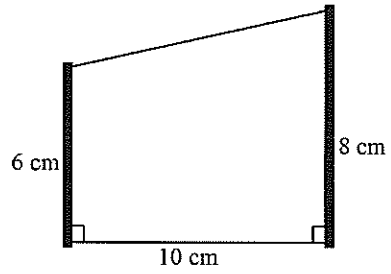
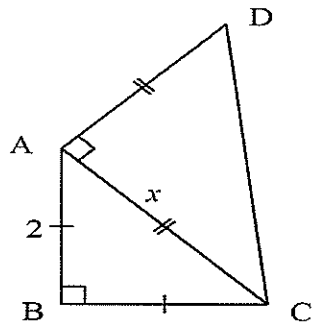
- Marks for each question are indicated on the question.
- Approved calculators may be used.
- All necessary working should be shown.
- Full marks may not be awarded for careless work or illegible writing.
- Write using black or blue pen.
- Write your answers in the space provided.

Number/ Pythagoras Theorem	Question 1	/12	Q6 a)	/2	/14
Algebraic Expressions	Question 2	/12	Q6 b)	/2	/14
Graphs/Statistics	Question 3	/12	Q6 c)	/2	/14
Measurement/ Geometry	Question 4	/12	Q6 d)	/2	/14
Equations and Inequalities	Question 5	/12	Q6 e)	/2	/14
			Total		**/70**

Part A

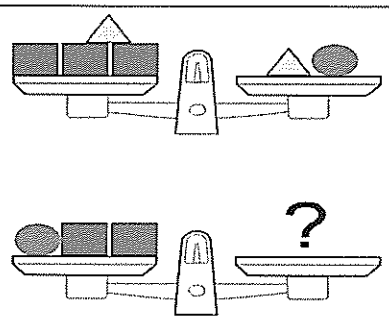
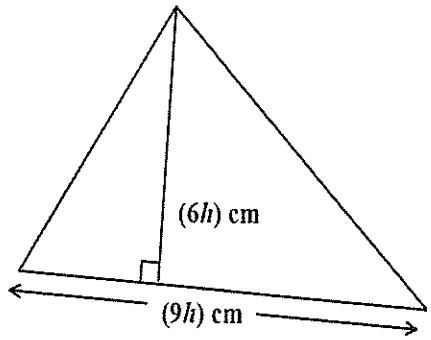
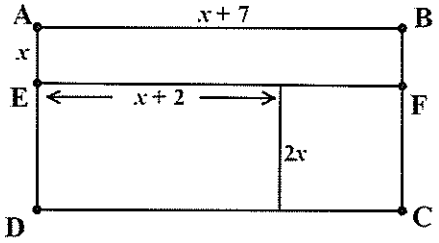
Question 1: Number/ Pythagoras Theorem

		Working and Answer	Marks
a)	64% of 13000 = ?		1
b)	Convert $3\frac{1}{5}$ into a percentage.		1
c)	If you buy 9 lollies at \$1.69 each, how much change will you get from \$20?		1
d)	Express $5\frac{3}{7}$% as decimal		1
e)	Find the rate of simple interest if an investment of \$1200 earns \$580 interest in three years.		1
f)	Find the value of x if $\frac{455}{273} = \frac{x}{12}$		1
g)	Find the retail price of a \$750 television whose price has been marked up by 12%.		1

h)	Jenny missed 14 days of the 48 school days in Term 3 due to illness. What percentage of school days did Jenny attend in Term 3?		1
i)	Two posts are 6cm tall and 8cm tall. If these posts are 10cm apart on the level ground and a string is stretched on the top of one post to the top of other, find the length of the string to the nearest cm.  		2
j)	i) Find the value of x. ii) Hence find the length of CD.  		2

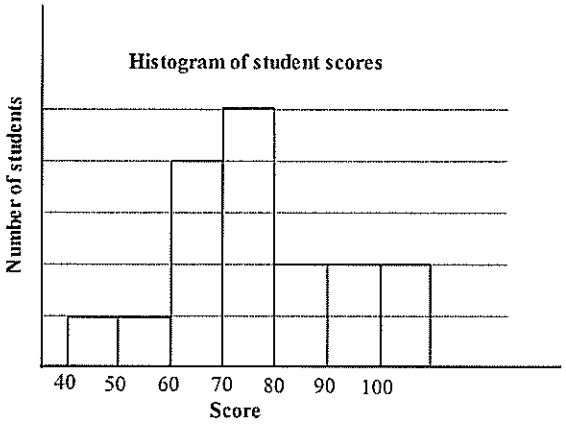
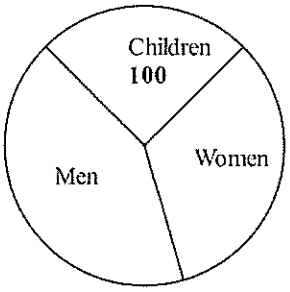
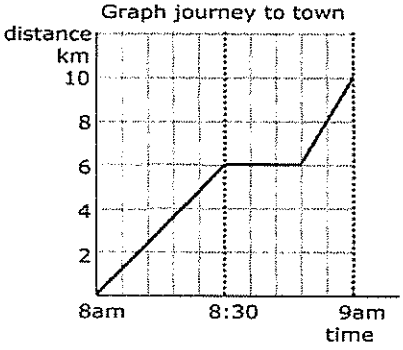
Question 2: Algebraic Expression

		Working and Answer	Marks
a)	Simplify i) $(-3x) \times (-3pq)$		1
	ii) $-7ab - 3ab + 6ba$		1
	iii) $\frac{16a^4b}{8ab^2}$		1
b)	Box A contains m pens and 2n pencils. Box B contains 3m pens and n pencils. If I buy 3 of Box A and 2 of Box B, write an expression for how many pens and pencils I will have altogether.		2
c)	Simplify expressions by collecting the like terms i) $6m - 6(m + 2)$		1
	i) $(2x + 2 - y) - (3x - 4 + y)$		1
d)	If $f(x) = 2x + 4x^2 - 5$, find $f(-2)$		1

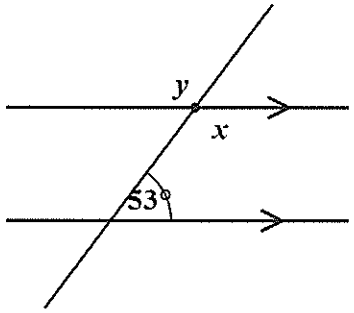
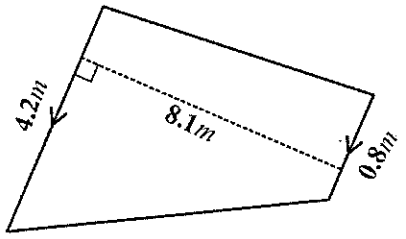
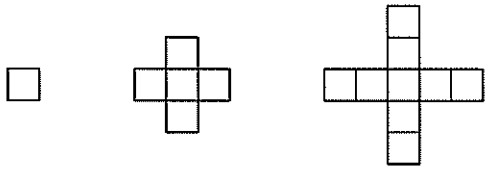
e)	 How many squares should be placed on the right side of the bottom scale to make it balance?		1
f)	Find a simple expression for the area of the figure below. 		1
g)	Write down an expression for the perimeter of the rectangle ABCD below in its <u>simplest form.</u> 		1
h)	Find the rule to describe the pattern for the given table of values. <table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>Y</td><td>-5</td><td>-2</td><td>1</td><td>4</td></tr></table>		1

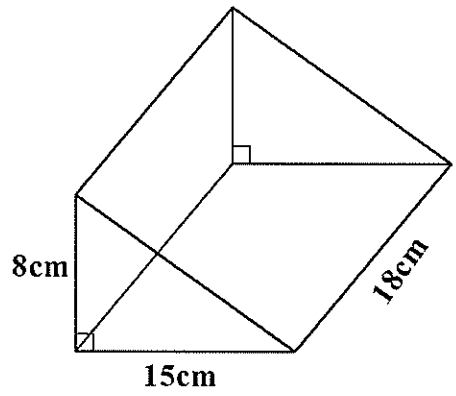
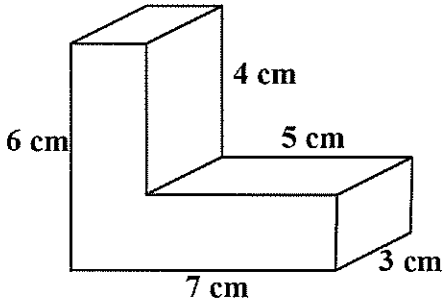
Question 3: Graphs and Statistics

		Working and Answer	Marks
a)	9 students took a test that was scored out of 10. 2 of them got a score of 0. 3 of them got a score of 4. 4 of them got a score of 8. What is the median score?		1
b)	$\{9, 1, 12, 15, 17, 9, 5, 1, 9, 10\}$ The above is a list of the number of problems that Benny worked on in the past 10 days. What is the mode?		1
c)	$-14, 21, -17, 25, 0, -19, 11, -20, 18$ The above are the points by which Jack's basketball team won/lost against his rival team in the last 9 games. What is the range of these points?		1
d)	Victor measured the heights of his students, who ranged from 80 cm to 120 cm. He recorded the data in the following stem and leaf plot. What is the height of the shortest student in class? 8 | 854 9 | 1604 10 | 48162 11 | 1618		1
e)	i) A set of data scores has a mean of 10. If we multiplied all the data scores by 2 , what would be the new mean?		1
	ii) A set of data scores has a range of 10. If we added 2 to all the data scores, what would be the new range?		1

f)	 The above histogram shows the test scores of students in a class. If 28 students scored from 40 to 60, how many students scored between 70 to 80?		2
g)	 At a country fair, $\frac{1}{4}$ of the attendees were children. i) How many people attended the fair? ii) If there are 180 men who attended, how many more men than women attended?		2
h)	The following travel graph shows Adam's journey to town from home  i) How long did Adam stop for? ii) What was the speed for the **first** part of the journey?		2

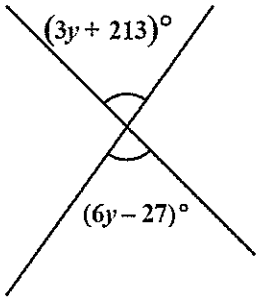
Question 4: Measurement and Volume

		Working and Answer	Marks
a)	Find the value of the pronumerals, giving reasons 	$x =$ ..... Reason: ..... $y =$ ..... Reason:	4
b)	Volume is measured in: A. Linear units B. Square units C. Cubic units D. Quartic units		1
c)	Complete $1m^3 =$ ..... cm^3		1
d)	Find the area of the trapezium 		1
e)	 Figure:1 Figure:2 Figure: 3 The perimeter of figure 1 is 4 units, and the perimeter of figure 2 is 12 units. What is the perimeter of figure 3?		1

f)	Find the surface area of this prism  		2
g)	Find the volume of the solid.  		2

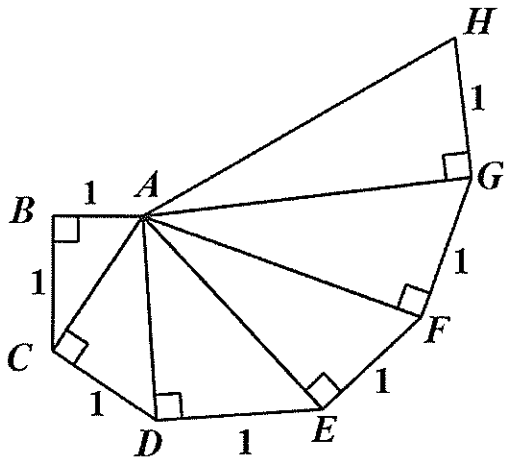
Question 5: Equations and Inequalities

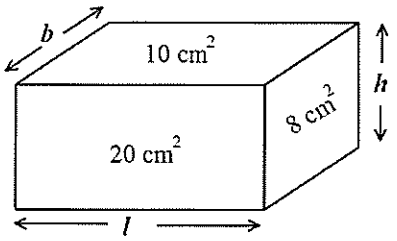
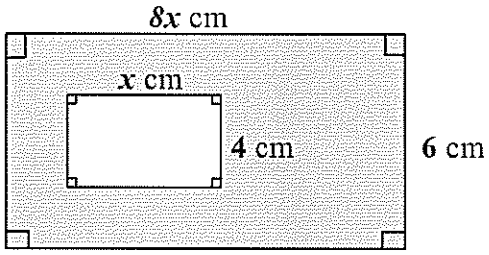
		Working and Answer	Marks
a)	Solve the equations i) $2(x+1)=5$		1
	ii) $\frac{3x}{5}+11=7$		2
b)	Solve the inequality $12x+5 \leq 10x+11$		1
c)	i) If $\Delta = b^2-4ac$, find Δ if $a=2, b=12$ and $c=-7$		1
	ii) If $y=ax^2+bx+c$ Find "a" if $x=5, b=2, y=210$ *and* $c=0$		2
d)	Represent $x<-6$ on a number line.		1

e)	I think of a number, add 5 to it, multiply this sum by 2 and then subtract 7. The result is 15. What is the number? (Form an equation and solve it)		**2**
f)	Find the value of the pronumeral in the following geometric diagram. 		**2**

Part B

Question 6: Miscellaneous

		Working and Answer	Marks
a)	Which triangle has the area of 1?  		2
b)	Simplify $3x(2x + 4y) - 3y(4x + z) - 3z(3x - 2y)$		2
c)	Let the median of 33 observations be 50. If each of the observations greater than the median is increased by 8 then what is the median of the new data? Explain your answer.		2

d)	 The area of three faces of the rectangular prism are shown. What is the volume of the solid?		2
e)	The area of the shaded region is 154~~m^2~~ cm^2 Find the value of x. 		2

Name: ..... Maths Class: .....

SYDNEY TECHNICAL HIGH SCHOOL

Year 8
Mathematics

Common Test 2

August 2017

Solution

Time allowed: 70 minutes

General Instructions:

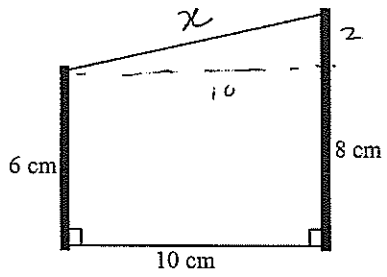
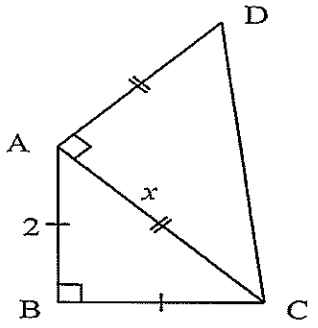
- Marks for each question are indicated on the question.
- Approved calculators may be used
- All necessary working should be shown
- Full marks may not be awarded for careless work or illegible writing
- Write using black or blue pen
- Write your answers in the space provided

Number/ Pythagoras Theorem	Question 1	/12	Q6 a)	/2	/14
Algebraic Expressions	Question 2	/12	Q6 b)	/2	/14
Graphs/Statistics	Question 3	/12	Q6 c)	/2	/14
Measurement/ Geometry	Question 4	/12	Q6 d)	/2	/14
Equations and Inequalities	Question 5	/12	Q6 e)	/2	/14
			Total		**/70**

Part A

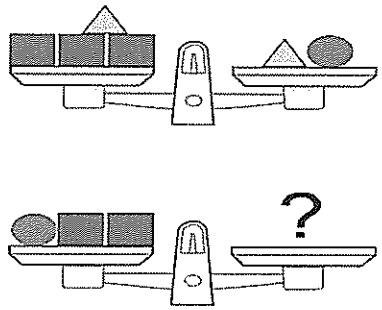
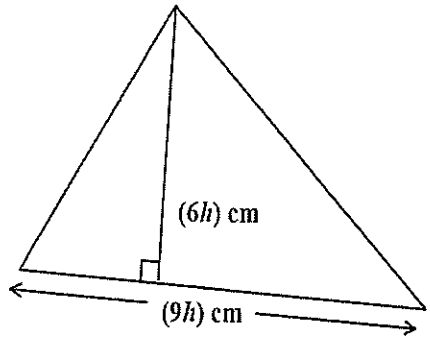
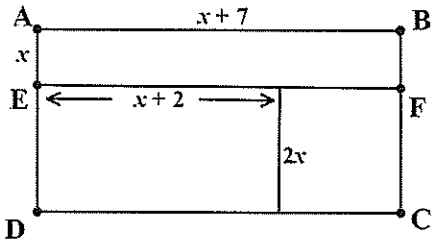
Question 1: Number/ Pythagoras Theorem

		Working and Answer	Marks
a)	64% of 13000 = ?	$=8320$	1
b)	Convert $3\frac{1}{5}$ into a percentage.	$=320\%$	1
c)	If you buy 9 lollies at \$1.69 each, how much change will you get from \$20?	\$4·79	1
d)	Express $5\frac{3}{7}\%$ as decimal	0·054 / 0·05	1
e)	Find the rate of simple interest if an investment of \$1200 earns \$580 interest in three years.	$580 = 1200 \times r \times 3$ $r = 16·11\%$	1
f)	Find the value of x if $\frac{455}{273} = \frac{x}{12}$	$x = 20$	1
g)	Find the retail price of a \$750 television whose price has been marked up by 12%.	$= 112\% \times 750$ $= 840$	1

h)	Jenny missed 14 days of the 48 school days in Term 3 due to illness. What percentage of school days did Jenny attend in Term 3?	Jenny attended $(48-14)$ days $= 34$ days $\frac{34}{48} \times 100 = 70.83\%$	1
i)	Two posts are 6cm tall and 8cm tall. If these posts are 10cm apart on the level ground and a string is stretched on the top of one post to the top of other, find the length of the string to the nearest cm. 	$x^2 = 10^2 + 2^2$ $x^2 = 104$ $x = 10.19$ cm ≈ 10 cm	2
j)	i) Find the value of x. ii) Hence find the length of CD. 	i) $x^2 = 2^2 + 2^2 = 8$ $x = \sqrt{8}$ unit ii) $CD^2 = AD^2 + AC^2$ $= (\sqrt{8})^2 + (\sqrt{8})^2$ [$\because AC = AD$] $= 16$ $\therefore CD = 4$ unit	2

Question 2: Algebraic Expression

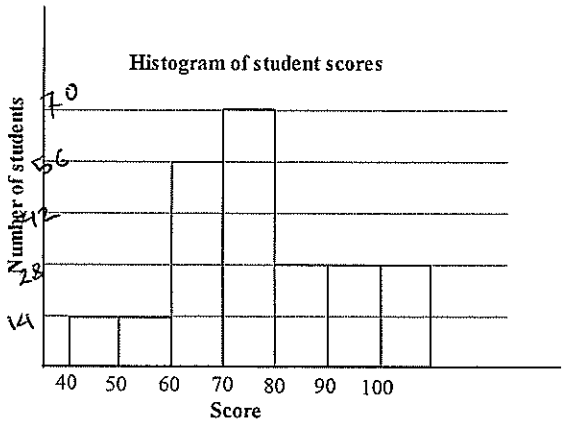
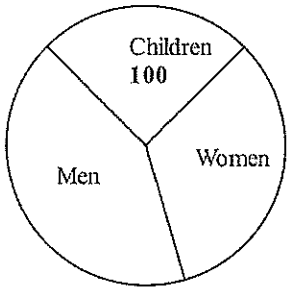
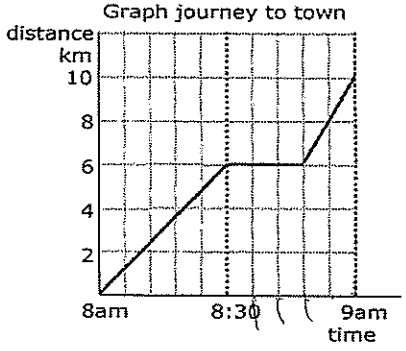
		Working and Answer	Marks
a)	Simplify i) $(-3x) \times (-3pq)$	$9pqx$	1
	ii) $-7ab - 3ab + 6ba$	$-4ab$	1
	iii) $\frac{16a^4b}{8ab^2}$	$\frac{2a^3}{b}$	1
b)	Box A contains m pens and 2n pencils. Box B contains 3m pens and n pencils. If I buy 3 of Box A and 2 of Box B, write an expression for how many pens and pencils I will have altogether.	Box A: $(m+2n) \times 3$ Box B: $(3m+n) \times 2$ $3m+6n+6m+2n$ $=9m+8n$ 9m pens and 8n pencils	2
c)	Simplify expressions by collecting the like terms i) $6m - 6(m+2)$	$6m-6m-12$ $=-12$	1
	i) $(2x+2-y)-(3x-4+y)$	$2x+2-y-3x+4-y$ $=-x-2y+6$	1
d)	If $f(x) = 2x + 4x^2 - 5$, find $f(-2)$	$f(-2) = 2(-2)+4(-2)^2-5$ $= -4+16-5$ $= 7$	1

e)	 How many squares should be placed on the right side of the bottom scale to make it balance?	5	1
f)	Find a simple expression for the area of the figure below. 	$A = \frac{1}{2} \times 9h \times 6h$ $= (27h^2)\,cm^2$	1
g)	Write down an expression for the perimeter of the rectangle ABCD below in its simplest form. 	Perimeter $= 2(x+7) + 2(x+2x)$ $= 2x + 14 + 6x$ $= 8x + 14$	1
h)	Find the rule to describe the pattern for the given table of values.	$y = 3x - 5$	1

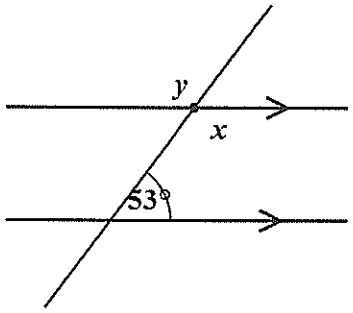
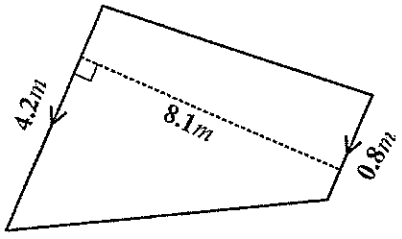
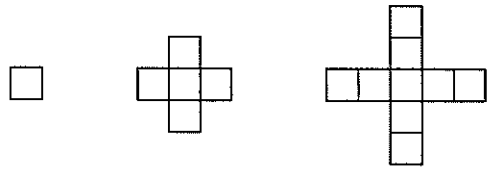
X	0	1	2	3
Y	-5	-2	1	4

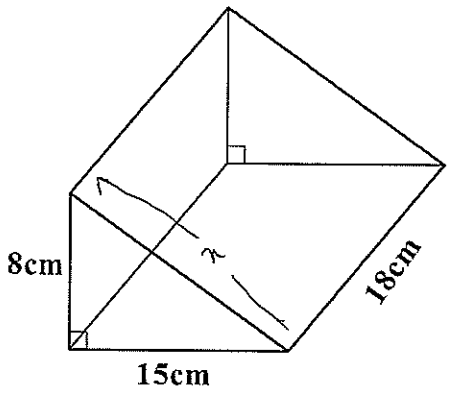
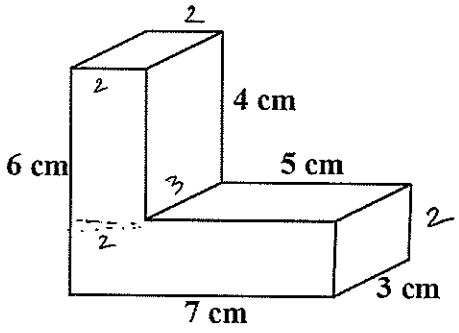
Question 3: Graphs and Statistics

		Working and Answer	Marks
a)	9 students took a test that was scored out of 10. 2 of them got a score of 0. 3 of them got a score of 4. 4 of them got a score of 8. What is the median score?	0 0 4 4 (4) 8 8 8 Median: 4	1
b)	$\{\underline{9}, 1, 12, 15, 17, \underline{9}, 5, 1, \underline{9}, 10\}$ The above is a list of the number of problems that Benny worked on in the past 10 days. What is the mode?	9	1
c)	$-14, 21, -17, 25, 0, -19, 11, -20, 18$ The above are the points by which Jack's basketball team won/lost against his rival team in the last 9 games. What is the range of these points?	$25 - (-20) = 45$	1
d)	Victor measured the heights of his students, who ranged from 80 cm to 120 cm. He recorded the data in the following stem and leaf plot. What is the height of the shortest student in class? 8 | 854 9 | 1604 10 | 48162 11 | 1618	84 cm	1
e)	i) A set of data scores has a mean of 10. If we multiplied all the data scores by 2 , what would be the new mean?	20	1
	ii) A set of data scores has a range of 10. If we added 2 to all the data scores, what would be the new range?	New range = 10	1

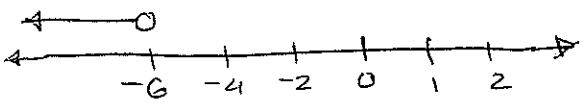
f)	 The above histogram shows the test scores of students in a class. If 28 students scored from 40 to 60, how many students scored between 70 to 80?	70	2
g)	 At a country fair, $\frac{1}{4}$ of the attendees were children. i) How many people attended the fair? ii) If there are 180 men who attended, how many more men than women attended?	i) $\frac{1}{4}x = 100$ $\therefore x = 400$ ii) Women = 400 − children − men = 400 − 100 − 180 = 120 $\therefore 180 - 120 = 60$ more men	2
h)	The following travel graph shows Adam's journey to town from home  i) How long did Adam stop for? ii) What was the speed for the **first** part of the journey?	i) 3 × 6 = 18 min ii) $\frac{6\text{ km}}{0.5\text{ hours}} = 12\text{ km/h}$	2

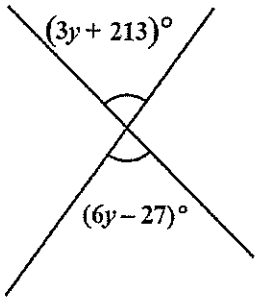
Question 4: Measurement and Volume

		Working and Answer	Marks
a)	Find the value of the pronumerals, giving reasons  	$x = 180^\circ - 53^\circ = 127^\circ$ Reason: Co-interior angles $y = 127^\circ$ Reason: Vertically opposite angles	4
b)	Volume is measured in: A. Linear units B. Square units C. Cubic units D. Quartic units	C	1
c)	Complete $1m^3 =$ ..... cm^3	$1000000\ cm^3$	1
d)	Find the area of the trapezium  	$A = \frac{1}{2} \times 8.1(4.2 + 0.8)$ $= 20.25\ m^2$	1
e)	 Figure:1 Figure:2 Figure: 3 The perimeter of figure 1 is 4 units, and the perimeter of figure 2 is 12 units. What is the perimeter of figure 3?	20 Units	1

f)	Find the surface area of this prism  	$x^2 = 8^2 + 15^2 \quad \therefore x = 17$ $SA = \left(\frac{1}{2} \times 15 \times 8 \times 2\right) + (15 \times 18)$ $+ (8 \times 18) + (17 \times 18)$ $= 840 \text{ cm}^2$	2
g)	Find the volume of the solid.  	$V = (4 \times 3 \times 2) + (7 \times 3 \times 2)$ $= 66 \text{ cm}^3$	2

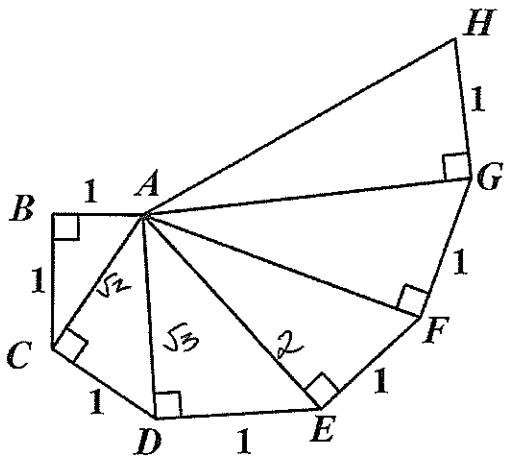
Question 5: Equations and Inequalities

		Working and Answer	Marks
a)	Solve the equations i) $2(x+1)=5$	$2x+2=5$ $x=\frac{3}{2}$	1
	ii) $\frac{3x}{5}+11=7$	$3x+55=35$ $3x=-20$ $x=-\frac{20}{3}$	2
b)	Solve the inequality $12x+5\leq 10x+11$	$12x\leq 10x+6$ $2x\leq 6$ $\therefore x\leq 3$	1
c)	i) If $\Delta=b^2-4ac$, find Δ if $a=2, b=12$ and $c=-7$	$\Delta=(12)^2-(4.2.-7)$ $=144+56$ $\boxed{\Delta=200}$	1
	ii) If $y=ax^2+bx+c$ Find "a" if $x=5, b=2, y=210$ *and* $c=0$	$210=a.5^2+2.5+0$ $200=a.5^2$ $200=25a$ $a=8$	2
d)	Represent $x<-6$ on a number line.		1

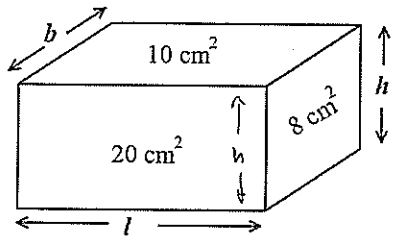
e)	I think of a number, add 5 to it, multiply this sum by 2 and then subtract 7. The result is 15. What is the number? (Form an equation and solve it)	let the number be x $2(x+5)-7=15$ $2x+10-7=15$ $2x+3=15$ $2x=12$ $x=6$	2
f)	Find the value of the pronumeral in the following geometric diagram.  	$3y+213=6y-27$ $213+27=6y-3y$ $240=3y$ $y=80$	2

Part B

Question 6: Miscellaneous

		Working and Answer	Marks
a)	Which triangle has the area of 1?  	$AE = \sqrt{1^2+1^2} = \sqrt{2}$ $AD = \sqrt{(\sqrt{2})^2+1^2} = \sqrt{3}$ $AE = \sqrt{(\sqrt{3})^2+1^2} = 2$ area of $\Delta AEF = \frac{1}{2} \times 1 \times 2 = 1$ $\therefore \Delta AEF$	2
b)	Simplify $3x(2x+4y) - 3y(4x+z) - 3z(3x-2y)$	$6x^2 + 12xy - 12xy - 3yz - 9zx + 6yz$ $= 6x^2 + 3yz - 9zx$	2
c)	Let the median of 33 observations be 50. If each of the observations greater than the median is increased by 8 then what is the median of the new data? Explain your answer.	Median = 50 The overall increase in the observations greater than the median donot change the ranking of the median.	2

d)



The area of three faces of the rectangular prism are shown. What is the volume of the solid?

$lh = 20$ $\quad bh = 8$ $\quad lb = 10$

$V = lbh$

$lh \times bh \times lb = 20 \times 8 \times 10$

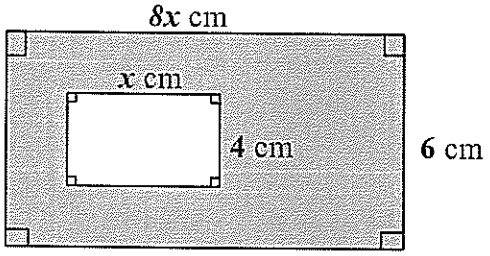
$(lbh)^2 = 1600$

$lbh = 40$

$\therefore V = 40 \text{ cm}^3$

2

e) The area of the shaded region is $154 m^2$ cm^2
Find the value of x.



$48x - 4x = 154$

$44x = 154$

$x = \frac{154}{44}$

$\therefore x = 3.5 \text{ cm}$

2