Sydney Technical High School

Name: .....

Maths Class: .....

Year 7

Mathematics

September, 2017

TIME ALLOWED: 70 minutes

Instructions:

- Write your name and class at the top of this page,
- No calculators may be used in any section.
- All necessary working must be shown. Marks may not be awarded for careless or badly arranged work.
- PART A is Multiple Choice, and is worth 5 marks
- PART B is worth 44 marks and PART C is worth 11 marks

(FOR MARKERS USE ONLY)

TOPIC	PART B		PART C		TOTAL
Fractions	QUEST 1	/9	(a)	/2	/11
Decimals and Percentages	QUEST 2	/9	(b)	/2	/11
Directed Numbers	QUEST 3	/9	(c)	/2	/11
Algebra	QUEST 4	/8	(d)	/3	/11
Geometry	QUEST 5	/9	(e)	/2	/11
				PART A	/5
				TOTAL	/60

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PART A (5 Marks)

Use the Multiple choice answer sheet provided on the next page to answer the following questions Each question is worth 1 mark.

(a) If it is given that $y = 4 - x^2$ then the value of y when $x = 1.5$ is

A. 1 B. 1.75 C. 2.5 D. 6.25

(b) Tim had \$32 to spend on his holidays.
He spent exactly the same amount each day until he had no more money left.
How much could he have spent each day?

A. \$3 B. \$4 C. \$5 D. \$6

(c) The minimum temperatures for Cooltown are taken over 5 days and are reported as:

Day	1	2	3	4	5
Temperature	$-8^o\,C$	$-10^o\,C$	$-4^o\,C$	$1^o\,C$	$-2^o\,C$

What is the difference between the highest and lowest minimum temperatures?

A. 3^oC B. 7^oC C. 9^oC D. 11^oC

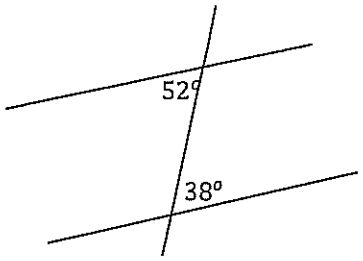
(d) Which expression is NOT equal to 2a ?

A. $a + a$ B $2 \times a$ C. $3a - a$ D. $a \times a$

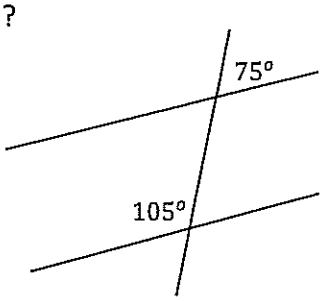
(e) The following four diagrams show a pair of lines cut by a transversal.

Which diagram shows a pair of lines which MUST be parallel?

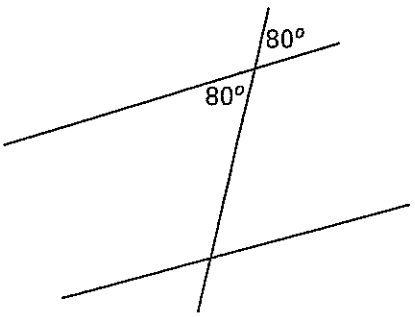
A.



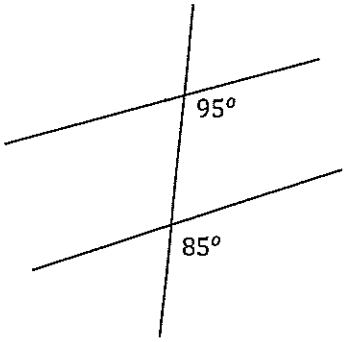
B



C.



D



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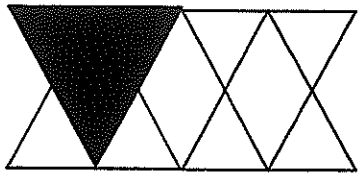
PART B

(Place your answer plus all working in the column at right)

QUESTION 1: FRACTIONS (9 marks)

		WORKING and ANSWER
(a)	In the diagram below, made from 4 identical interlocking triangles, what fraction has been shaded? (Give the answer in simplest form) 	
(b)	Helen has 15 red lollies, 13 green lollies and 12 white lollies. What fraction are red?	
(c)	Find the HCF of 75 and 125	
(d)	A copying machine prints 1,800 leaflets. One third are on yellow paper and the rest on blue paper. There are smudges on 5% of the blue leaflets. How many blue leaflets have NO smudges?	
(e)	Simplify $3\frac{2}{5} - 2\frac{1}{2}$	
(f)	Find the number of minutes in $2\frac{3}{5}$ hours	

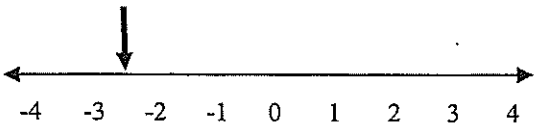
(g)	Tommy is copying his notes from today into a 128-page exercise book. He takes five-eighths of the pages for his English notes, and one quarter of the pages for his Science notes. How many pages has he got left for his Maths notes?	
(h)	Simplify $3\frac{3}{7} \times \frac{3}{8}$ leaving your answer as an IMPROPER FRACTION	
(i)	$\frac{3}{5}$ of a number is 48. What is the number?	

QUESTION 2: DECIMALS ands PERCENTAGES (9 marks)

		Working and Answer
(a)	Convert $\frac{3}{8}$ to a decimal.	
(b)	A lottery pays out a total of $300,000 in prizemoney to first, second and third prizewinners. The money is divided so: 1st prize - 50% 2nd prize - 30% 3rd prize - 20% A syndicate of 12 persons wins third prize. How much does EACH person receive?	
(c)	Convert $\frac{5}{6}$ to a recurring decimal	
(d)	Simplify 1.7943 ÷ 0.003	
(e)	The number of people attending a final of a football game was given by the (very mathematical) announcer as: "46,000 to the nearest 1,000" What is the maximum number of people there could have been in attendance to give this estimate?	
(f)	In Australia, 0.5% of people have a rare blood type. Given there are 24,000,000 people in Australia, how many have this blood type?	

(g)	What is 2.8482 correct to one decimal place?	
(h)	Simplify 21.6 X 0.05	
(i)	A ticket to a concert costs $75 plus 10% administration fee. What does it cost me to buy a ticket?	

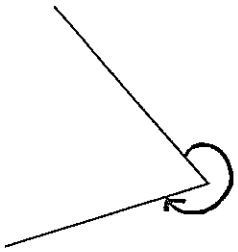
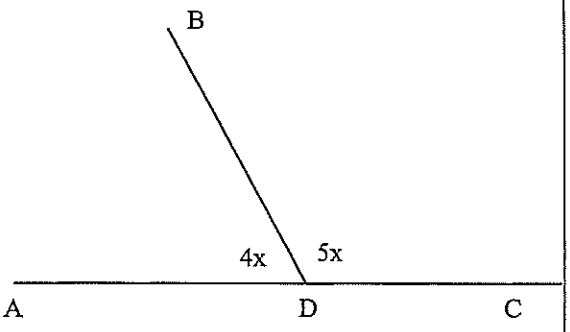
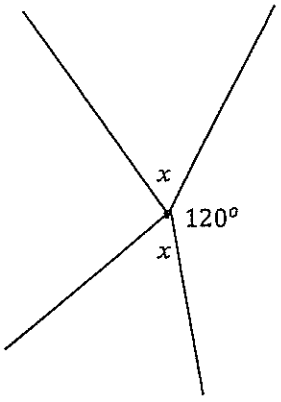
QUESTION 3: DIRECTED NUMBERS (9 marks)

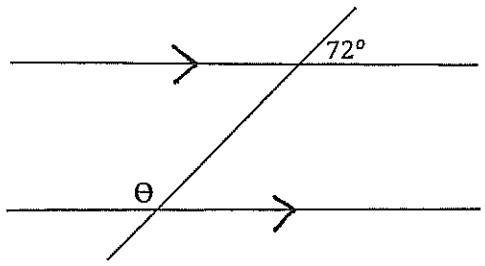
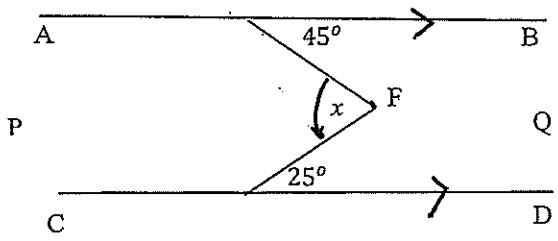
		Working and Answer
(a)	Simplify the following: (i) $6-(-4)$ (ii) -36 divided by 9 (iii) $-5+5\times-2$	(i) (ii) (iii)
(b)	Is this statement TRUE or FALSE? $-5 > -3$	
(c)	What number is approximately indicated by the arrow in this diagram?  	
(d)	Evaluate (i) $(-2)^5$ (ii) $\frac{7\times-4\times2}{-8}$	(i) (ii)
(e)	Insert a value for x to make this statement true: $-6+4-3-x-10=0$	
(f)	Find the value of x that mkes this statement true $x+32=16$	

QUESTION 4: ALGEBRA (8 marks)

		Working and Answer
(a)	$7a + 5b - 5a + 7b =$	
(b)	$8x^6 \div 2x^3 =$	
(c)	$-3ay \times 5a =$	
(d)	$12xy - 5p - 3xy - 3p =$	
(e)	Simplify $\frac{4x^2}{16x}$	
(f)	Write an expression for 7 less than the product of $2x$ and 5	
(g)	If $x = 4$ and $y = -3$, find the value of $x - 3y$	
(h)	Give the rule connecting x and y in the function box below: | x | 0 | 1 | 2 | | y | 5 | 3 | 1 |	

QUESTION 5: GEOMETRY (9 marks)

		Working and Answer
(a)	Give a name for the angle indicated below: 	**1 Mark**
(b)	ADC is a straight line. Find the size of $\angle BDC$, giving a reason. 	**REASON** **2 marks**
(c)	Find the value of x in the following, and give a reason 	**REASON** **2 marks**

(c)	Find the size of the angle marked θ *giving a reason*  	**REASON** **2 marks**
(e)	Find the value of x in the following diagram:  	**SHOW ALL STEPS and GIVE REASONS:** <u>Step 1:</u> Join P to Q through the point F and parallel to AB **2 Marks**

PART C

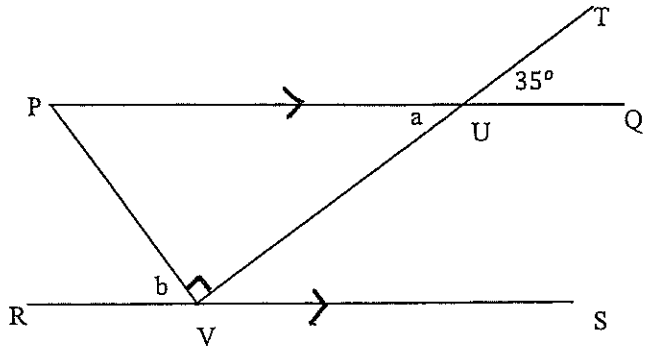
(12 Marks)

			ANSWER and WORKING
(a)	(i)	Simplify $2\frac{2}{5} \div 1\frac{1}{2}$ giving your answer as a mixed fraction.	
	(ii)	What fraction sits exactly half-way between $\frac{1}{5}$ and $\frac{1}{3}$	

			ANSWER and WORKING
(b)	(i)	Find $\sqrt{0.04}$	
	(ii)	Round 349.9 to the nearest one hundred	

			ANSWER and WORKING
(c)	(i)	Two numbers have a product of - 36 and a sum of 5. What are they?	
	(ii)	If $a = 3$ and $b = -4$ find the value of ab^2	

			ANSWER and WORKING
(d)	(i)	Find the value of $5a - (a+b)^2$ when $a = -5$ and $b = 3$	
	(ii)	Simplify the expression $(2d^3)^2$	
	(iii)	You are given that $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$ Find the value of $\sqrt[3]{216}$	

		ANSWER and WORKING
(e)	In the following diagram, $PQ \parallel RS$ and $\angle TUQ = 35^o$ $\angle UVP = 90^o$  Find the value of: *(i)* a *(ii)* b	(i) (ii)

Sydney Technical High School

MULTIPLE CHOICE ANSWER SHEET

YEAR 7 MATHEMATICS

Completely fill the response oval representing the most correct answer.
Do not remove this sheet from the answer booklet.

1. A ○ B ○ C ○ D ○
2. A ○ B ○ C ○ D ○
3. A ○ B ○ C ○ D ○
4. A ○ B ○ C ○ D ○
5. A ○ B ○ C ○ D ○

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Sydney Technical High School

Name: SOLUTIONS

Maths Class: .....

Year 7

Mathematics

September, 2017

TIME ALLOWED: 70 minutes

Instructions:

- Write your name and class at the top of this page,
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- PART B is worth 44 marks and PART C is worth 11 marks

(FOR MARKERS USE ONLY)

TOPIC	PART B		PART C		TOTAL
Fractions	QUEST 1	/9	(a)	/2	/11
Decimals and Percentages	QUEST 2	/9	(b)	/2	/11
Directed Numbers	QUEST 3	/9	(c)	/2	/11
Algebra	QUEST 4	/8	(d)	/3	/11
Geometry	QUEST 5	/9	(e)	/2	/11
				PART A	/5
				TOTAL	/60

Sydney Technical High School

MULTIPLE CHOICE ANSWER SHEET

YEAR 7 MATHEMATICS

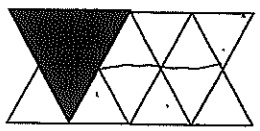
Completely fill the response oval representing the most correct answer.
Do not remove this sheet from the answer booklet.

1. A ○ B ● C ○ D ○
2. A ○ B ● C ○ D ○
3. A ○ B ○ C ○ D ●
4. A ○ B ○ C ○ D ●
5. A ○ B ● C ○ D ○

PART B

(Place your answer plus all working in the column at right)

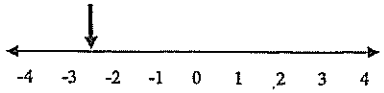
QUESTION 1: FRACTIONS (9 marks)

		WORKING and ANSWER
(a)	In the diagram below, made from 4 identical interlocking triangles, what fraction has been shaded? (Give the answer in simplest form) 	$\frac{4}{14} = \frac{2}{7}$.
(b)	Helen has 15 red lollies, 13 green lollies and 12 white lollies. What fraction are red?	$15/40 = 3/8$
(c)	Find the HCF of 75 and 125	25
(d)	A copying machine prints 1,800 leaflets. One third are on yellow paper and the rest on blue paper. There are smudges on 5% of the blue leaflets. How many blue leaflets have NO smudges?	Yellow = 600 Blue = 1200. Smudges = 60 ∴ Ans = 1140
(e)	Simplify $3\frac{2}{5} - 2\frac{1}{2}$	$\frac{17}{5} - 5/2$ $= \frac{34}{10} - \frac{25}{10}$ $= 9/10$
(f)	Find the number of minutes in $2\frac{3}{5}$ hours	2hr = 120 min. 3/5hr = 36 min ∴ 156 mins
(g)	Tommy is copying his notes from today into a 128-page exercise book. He takes five-eighths of the pages for his English notes, and one quarter of the pages for his Science notes. How many pages has he got left for his Maths notes?	E Sc $5/8 + 1/4 = 7/8$ $\therefore 1/8 \times 128 = 16$ pages
(h)	Simplify $3\frac{3}{7} \times \frac{3}{8}$ leaving your answer as an IMPROPER FRACTION	$\frac{24}{7} \times \frac{3}{8} = 9/7$. (accept $1\frac{2}{7}$)
(i)	$\frac{3}{5}$ of a number is 48. What is the number?	$\frac{3}{5} x = 48$ ∴ 80.

QUESTION 2: DECIMALS ands PERCENTAGES (9 marks)

		Working and Answer
(a)	Convert $\frac{3}{8}$ to a decimal.	0.375
(b)	A lottery pays out a total of $300 000 in prizemoney to first, second and third prizewinners. The money is divided so: 1st prize - 50% 2nd prize - 30% 3rd prize - 20% A syndicate of 12 persons wins third prize. How much does EACH person receive?	$300000 \times \frac{20}{100}$ $= \$60000$ $\therefore$ each is $\$5,000$
(c)	Convert $\frac{5}{6}$ to a recurring decimal	$0.8\dot{3}$ (accept 0.8333....)
(d)	Simplify 1.7943 ÷ 0.003	$\frac{1.7943}{0.003}$ $= \frac{1794.3}{3}$ $= 598.1$
(e)	The number of people attending a final of a football game was given by the (very mathematical) announcer as: "46 000 to the nearest 1 000" What is the maximum number of people there could have been in attendance to give this estimate?	46,499
(f)	In Australia, 0.5% of people have a rare blood type. Given there are 24 000 000 people in Australia, how many have this blood type?	$\frac{0.5}{100} \times 24000000$ $= 5 \times 24000$ $= 120,000$
(g)	What is 2.8482 correct to one decimal place?	2.8
(h)	Simplify 21.6 X 0.05	1080
(i)	A ticket to a concert costs $75 plus 10% administration fee. What does it cost me to buy a ticket?	75 + 7.50 $82.50

QUESTION 3: DIRECTED NUMBERS (9 marks)

		Working and Answer
(a)	Simplify the following: (i) $6-(-4)$ (ii) -36 divided by 9 (iii) $-5+5\times-2$	(i) 10 (ii) -4 (iii) -15
(b)	Is this statement TRUE or FALSE? $-5 > -3$	FALSE
(c)	What number is approximately indicated by the arrow in this diagram?  	-2.5
(d)	Evaluate (i) $(-2)^5$ (ii) $\frac{7\times-4\times2}{-8}$	(i) -32 (ii) 7.
(e)	Insert a value for x to make this statement true: $-6+4-3-x-10=0$	$-2-3-x-10=0$ $\therefore -5-x-10=0$ $x=-15$
(f)	Find the value of x that makes this statement true $x+32=16$	$x=-16$

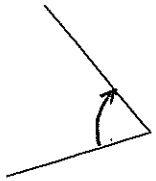
QUESTION 4: ALGEBRA (8 marks)

		Working and Answer
(a)	$7a+5b-5a+7b=$	$2a+12b$
(b)	$8x^6 \div 2x^3 =$	$4x^3$
(c)	$-3ay \times 5a =$	$-15a^2y$.
(d)	$12xy-5p-3xy-3p=$	$9xy-8p$.
(e)	Simplify $\frac{4x^2}{16x}$	$x/4$ accept $1/4\,x$
(f)	Write an expression for 7 less than the product of $2x$ and 5	$10x-7$ Do NOT accept $5\times2x-7$
(g)	If $x=4$ and $y=-3$, find the value of $x-3y$	$4+9$ $=13$.
(h)	Give the rule connecting x and y in the function box below: x: 0 1 2 y: 5 3 1	$y=5-2x$.

QUESTION 5: GEOMETRY (9 marks)

Working and Answer

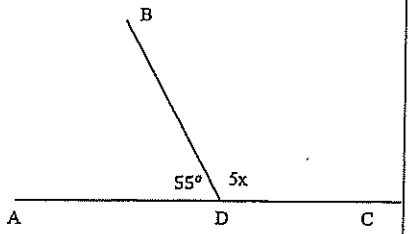
(a) Give a name for the angle indicated below:



acute

1 Mark

(b) ADC is a straight line. Find the size of $\angle BDC$, giving a reason.



25° (1)

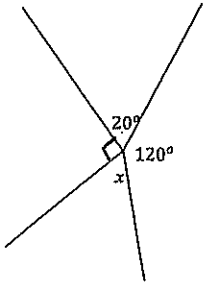
REASON

a straight line has 180° (1)

(or anything close to this)

2 marks

(c) Find the value of x in the following, and give a reason



$x = 130°$ (1)

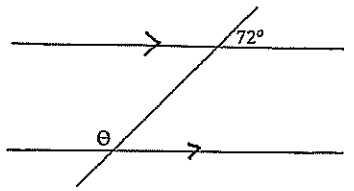
REASON

all angles add up to 360° in a revolution

(or close) (1)

2 marks

(d) Find the size of the angle marked θ *giving a reason*



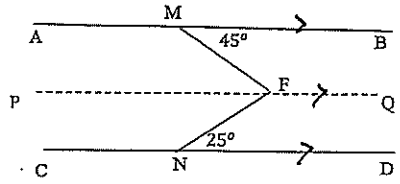
$\theta = 108°$ (1)

REASON

(1) { alternate angles / corresponding angles / vertically opposite angles (anything reasonable)

2 marks

(e) Find the size of $\angle MFN$ in the following diagram:



SHOW ALL STEPS and GIVE REASONS:

(1) { $\angle MFP = 45°$ (alternate angles) / $\angle NFP = 25°$ (alternate angles)

(1) $\therefore \angle MFN = 70°$

(accept reasonable reasons)

2 Marks

PART C

(11 Marks)

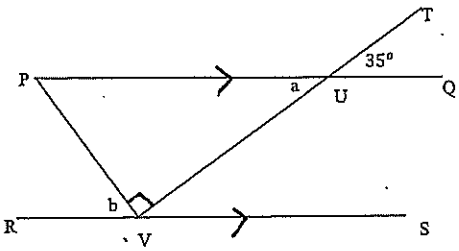
			ANSWER and WORKING
(a)	(i)	Simplify $2\frac{2}{5} \div 1\frac{1}{2}$ giving your answer as a mixed fraction.	$\frac{12}{5} \times \frac{2}{3}$ $\therefore \frac{8}{5}$ $= 1\frac{3}{5}$ } accept either (1)
	(ii)	What fraction sits exactly half-way between $\frac{1}{5}$ and $\frac{1}{3}$	$\left(\frac{1}{5} + \frac{1}{3}\right) \div 2$ $= \frac{8}{15} \div 2$ $= \frac{4}{15}$ (1)

			ANSWER and WORKING
(b)	(i)	Find $\sqrt{0.04}$	0.2 (1)
	(ii)	Round 349.9 to the nearest one hundred	300 (1)

			ANSWER and WORKING
(c)	(i)	Two numbers have a product of -36 and a sum of 5. What are they?	9 and −4 (1)
	(ii)	If $a = 3$ and $b = -4$ find the value of ab^2	48 (1)

			ANSWER and WORKING
(d)	(i)	Find the value of $5a - (a+b)^2$ when $a = -5$ and $b = 3$	−29
	(ii)	Simplify the expression $(2d^3)^2$	$4d^6$
	(iii)	You are given that $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$ Find the value of $\sqrt[3]{216}$	$2 \times 3 = 6$.

1 each

		ANSWER and REASONS
(e)	In the following diagram, $PQ \parallel RS$ and $\angle TUQ = 35°$ $\angle UVP = 90°$  Find the value of: *(i)* a *(ii)* b	(i) $a = 35°$ (ii) $\angle UVS = 35°$. $\therefore b = 55°$. 1 each