SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9

COMMON ASSESSMENT TASK 1

2014

Part A : Non Calculator Section

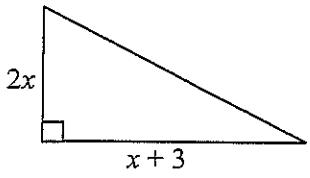
Name: _____

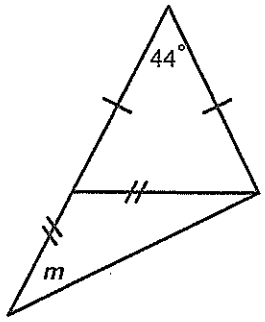
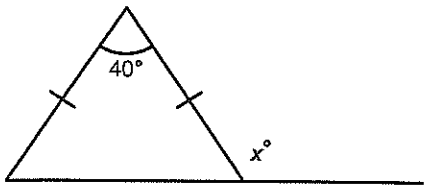
Teacher: _____

General Instructions

- Write using a blue or black pen.
- Calculators are NOT allowed for this section.
- All necessary working should be shown.
- Attempt All Questions
- Time Allowed: 10 minutes.
- Total Marks: 10

Marks :

1	What is the coefficient of xy in the algebraic expression $5x^2 - 3xy + 28a - wxy$		**1**
2	Expand and simplify: $5(2x - 6) + 3x(2x - 4)$		**2**
3	If two coins are tossed, the probability of obtaining at least one head is?		**1**
4	Evaluate $(2m^4)^3$		**1**
5	Write an expression for the area of this shape. Expand and simplify the expression.  		**1**
6	Express 16290000000 in scientific notation		**1**
7	Write the value of $8^{-\frac{2}{3}}$		**1**

8	Find the value of m  		**1**
9	Marcus follows four teams in four different sports. Each team's recent record of wins and losses is shown below. (No team draws with opponents) **Sport** / **Team** / **Record** Rugby League / Leopards / 14 wins from 20 games Rugby Union / Banksias / 6 wins and 2 losses Basketball / Emperors / A 65% success rate Aussie Rules / Geese / Lost $\frac{1}{3}$ of their games Based on recent records, which team has the greater probability of winning their next game?		**1**
10	Find x  		**1**

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9

COMMON ASSESSMENT TASK 1

2014

Part B: Calculator Section

Name: _____

Teacher: _____

General Instructions

- Write using a blue or black pen.
- Calculators are allowed for this section.
- All necessary working should be shown.
- Attempt All Questions
- Time Allowed: 60 minutes.
- Total Marks: 60

Non- Calculator		**10**
Indices		**10**
Surds		**10**
Algebra		**17**
Geometry		**15**
Probability		**13**
Total		**75**

Indices

1.	Simplify a) 4×3^0		**1**
	b) $a^2 \times a^3$		**1**
	c) $(3x^2y^3)^4$		**1**
	d) $12x^4y^3 \div 8x^2y$		**1**
2.	Simplify the following expression $\sqrt[3]{p^9q^{-6}}$ (give your answer with positive indices):		**2**
3.	Simplify $\frac{\sqrt{a^3}}{a}$ and write in index form.		**1**
4.	If $2^x = 16$, evaluate 2^{x+3}		**1**
5.	Express 0.000 000 0053 in scientific notation		**1**
6.	Simplify $27^x \times 3^{5x}$		**1**

Surds

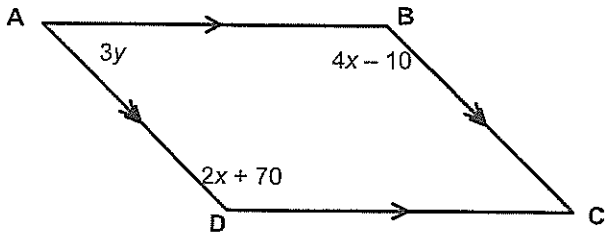
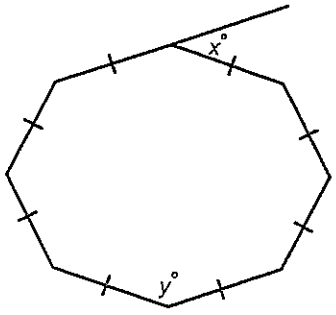
1.	Which of the following are irrational? $\frac{2}{3}$ $\sqrt{5}$ $\sqrt{9}$ π $0.\dot{6}$		**1**
2.	Simplify fully $3\sqrt{12} + \sqrt{27}$		**1**
3.	Write as an entire surd $4\sqrt{5}$		**1**
4.	Expand and simplify a) $4\sqrt{3}(\sqrt{3} + 2\sqrt{5})$		**1**
	b) $(\sqrt{2} + 5)(\sqrt{3} - 2)$		**1**
	c) $(3\sqrt{2} + \sqrt{7})^2$		**2**
5.	Rationalise the denominator $\frac{5}{2\sqrt{a}}$		**1**
6.	Rationalise $\frac{4}{\sqrt{3} + \sqrt{2}}$		**2**

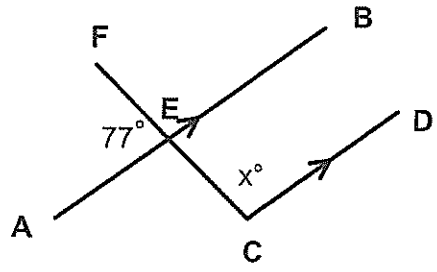
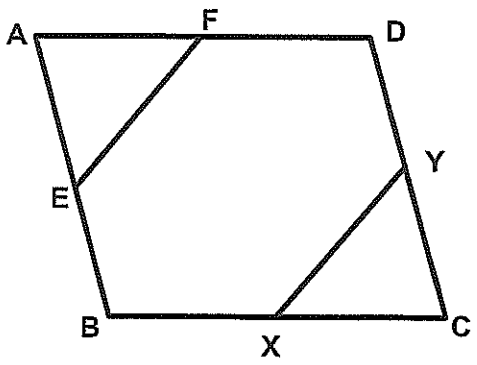
Algebra

1.	Simplify the following expressions a) $5ab - 7 + 3ba - 9$	**1**
	b) $14ab \times -\frac{1}{2}ab$	**1**
	c) $-8a^2 b \div 16ab^2$	**1**
	d) $\frac{7}{2m} - \frac{2}{5m}$	**1**
	e) $\frac{2x}{3} + \frac{y}{4a}$	**2**
2.	Expand and simplify a) $-2a(a - 8) - (a^2 + a)$	**2**
	b) $(\mathbf{k} + 6)(2\mathbf{k} + 3)$	**2**
	c) $(x + 2x)^2 - x - 2a$	**2**

3.	If $p=5$, $q=2$ and $r=-6$, find a) $p^2-\frac{r}{q}$	1
	b) $(p+q)(r-4)$	1
	c) $\frac{2p+r}{pq^2}$	1
4.	a) If two lengths of rope, each x m long, are cut from a piece of rope y m long, what length is left? .... b) What is the total distance covered in 3 hours at p km/h and t hours at n km/h	1 1

Geometry

1	State 2 properties that would indicate definitely that a shape was a parallelogram	2
2	Find the value of the angles indicated. Give reasons. 	4
3	Find x and y, giving reasons 	4

4	Given that AB is parallel to CD, find x giving reasons 	2
5	Given that AF = XC , AE = CY and ABCD is a parallelogram, Prove that $\Delta AEF \equiv \Delta XCY$ 	3

Probability

1. A card is to be chosen at random from a standard deck of 52. Find the probability that is will be:

a) the 9 of hearts **1**

b) a spade **1**

b) an ace or a heart **1**

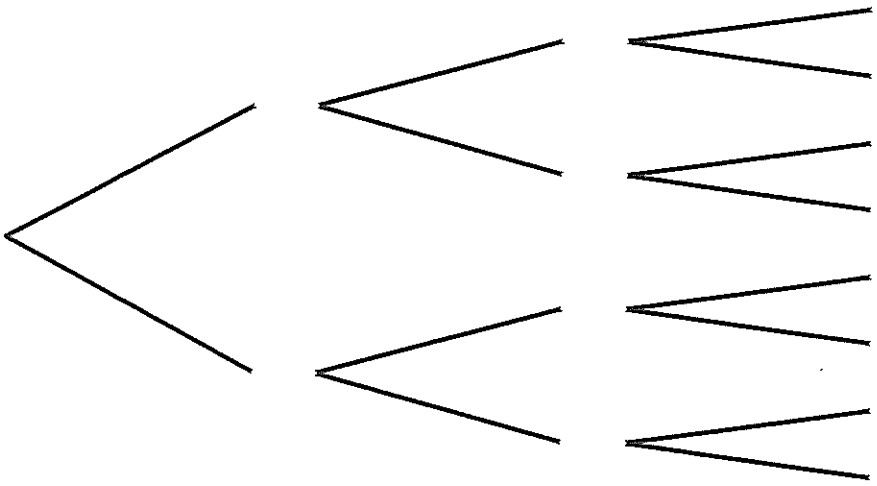
2. The probability of a certain iphone being faulty is $\frac{1}{2000}$. If 50000 of these iphones are produced, how many would you expect to be faulty? **1**

.....

.....

3. A coin is tossed three times.

(i) Complete the tree diagram **1**



Find the probability of getting:

(ii) Three heads. **1**

(iii) Two heads. **1**

(iv) At least one tail **1**

4. In a group of 45 students, 23 have visited France, 17 have visited Germany and 10 students have been to neither country.

a) Draw a Venn Diagram to illustrate this information **2**

b) If one student is selected at random, what is the probability they have visited both France and Germany? **1**

5. If two dice are rolled and the possible results recorded in the table, find the probability of rolling

	1	**2**	**3**	**4**	**5**	**6**
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

a) the sum of the numbers on the two dice is greater than 8 ..... **1**

b) a 6 showing at least on one dice. **1**

☺ End of Examination ☺

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9

COMMON ASSESSMENT TASK 1

2014

Part A : Non Calculator Section

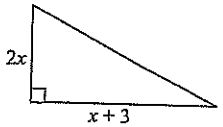
Name: Solutions

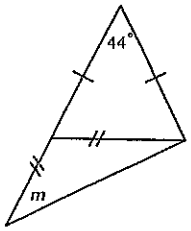
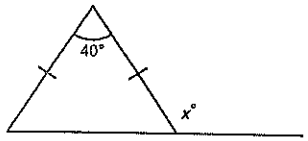
Teacher: _____

General Instructions

- Write using a blue or black pen.
- Calculators are NOT allowed for this section.
- All necessary working should be shown.
- Attempt All Questions
- Time Allowed: 10 minutes.
- Total Marks: 10

Marks : _____

1	What is the coefficient of xy in the algebraic expression $5x^2 - 3xy + 28a - wxy$	-3	1
2	Expand and simplify: $5(2x-6) + 3x(2x-4)$	$6x^2 - 2x - 30$	2
3	If two coins are tossed, the probability of obtaining at least one head is?	$\frac{3}{4}$	1
4	Evaluate $(2m^4)^3$	$8m^{12}$	1
5	Write an expression for the area of this shape. Expand and simplify the expression. 	$\frac{1}{2} \times 2x(x+3)$ $= x^2 + 3x$	1
6	Express 16290000000 in scientific notation	1.629×10^{10}	1
7	Write the value of $8^{-\frac{2}{3}}$	$\frac{1}{\sqrt[3]{8^2}} = \frac{1}{4}$	1

8	Find the value of m  	$m = 34°$	1
9	Marcus follows four teams in four different sports. Each team's recent record of wins and losses is shown below. (No team draws with opponents) **Sport** / **Team** / **Record** Rugby League / Leopards / 14 wins from 20 games Rugby Union / Banksias / 6 wins and 2 losses Basketball / Emperors / A 65% success rate Aussie Rules / Geese / Lost $\frac{1}{3}$ of their games Based on recent records, which team has the greater probability of winning their next game?	Rugby Union - Banksias	1
10	Find x  	$x = 140°$	1

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9

COMMON ASSESSMENT TASK 1

2014

Part B: Calculator Section

Name: Solutions

Teacher: _____

General Instructions

- Write using a blue or black pen.
- Calculators are allowed for this section.
- All necessary working should be shown.
- Attempt All Questions
- Time Allowed: 60 minutes.
- Total Marks: 60

Non- Calculator		10
Indices		10
Surds		10
Algebra		17
Geometry		15
Probability		13
Total		75

1.	Simplify a) 4×3^0	4	1
	b) $a^2 \times a^3$	a^5	1
	c) $(3x^2y^3)^4$	$81x^8y^{12}$	1
	d) $12x^4y^3 \div 8x^2y$	$\frac{3x^2y^2}{2}$	1
2.	Simplify the following expression $\sqrt[3]{p^9q^{-6}}$ (give your answer with positive indices): p^3q^{-2}	$\frac{p^3}{q^2}$	2
3.	Simplify $\frac{\sqrt{a^3}}{a}$ and write in index form. $a^{\frac{3}{2}} \div a^1$	$a^{\frac{1}{2}}$	1
4.	If $2^x = 16$, evaluate 2^{x+3}	$x = 4$	1
5.	Express 0.000 000 0053 in scientific notation	5.3×10^{-9}	1
6.	Simplify $27^x \times 3^{5x}$	3^{8x}	1

Surds

1.	Which of the following are irrational? $\frac{2}{3}$ $\sqrt{5}$ $\sqrt{9}$ π $0.\dot{6}$	$\sqrt{5}$, π	1
2.	Simplify fully $3\sqrt{12} + \sqrt{27}$ $= 3 \times 2 \times \sqrt{3} + 3\sqrt{3}$ $= 6\sqrt{3} + 3\sqrt{3}$	$9\sqrt{3}$	1
3.	Write as an entire surd $4\sqrt{5}$ $\sqrt{16} \times \sqrt{5}$	$\sqrt{80}$	1
4.	Expand and simplify a) $4\sqrt{3}(\sqrt{3} + 2\sqrt{5})$	$12 + 8\sqrt{15}$	1
	b) $(\sqrt{2} + 5)(\sqrt{3} - 2)$	$\sqrt{6} - 2\sqrt{2} + 5\sqrt{3} - 10$	1
	c) $(3\sqrt{2} + \sqrt{7})^2$	$25 + 6\sqrt{14}$	2
5.	Rationalise the denominator $\frac{5}{2\sqrt{a}}$	$\frac{5\sqrt{a}}{2a}$	1
6.	Rationalise $\frac{4}{\sqrt{3} + \sqrt{2}}$	$4\sqrt{3} - 4\sqrt{2}$	2

1. Simplify the following expressions

a) $5ab - 7 + 3ba - 9$ — **1**

$8ab - 16$

b) $14ab \times -\frac{1}{2}ab$ — **1**

$-7a^2b^2$

c) $-8a^2b \div 16ab^2$ — **1**

$\frac{a}{2b}$

d) $\frac{7}{2m} - \frac{2}{5m}$ — **1**

$\frac{31}{10m}$

e) $\frac{2x}{3} + \frac{y}{4a}$ — **2**

$\frac{8xa + 3y}{12a}$

2. Expand and simplify

a) $-2a(a - 8) - (a^2 + a)$ — **2**

$= -16a^2 + 16 - a^2 - a$

$= -17a^2 + 16 - a$

b) $(k + 6)(2k + 3)$ — **2**

$= 2k^2 + 3k + 12k + 18$

$= 2k^2 + 15k + 18$

c) $(x + 2x)^2 - x - 2a$ — **2**

$= 9x^2 + x - 2a$

3. If $p=5$, $q=2$ and $r= -6$, find

a) $p^2 - \frac{r}{q}$ — **1**

$25^2 - \left(\frac{-6}{2}\right) = 28$

b) $(p + q)(r - 4)$ — **1**

$(5+2)(-6-4) = -70$

c) $\frac{2p + r}{pq^2}$ — **1**

$\frac{2 \times 5 - 6}{5 \times 2^2} = \frac{4}{20}$

$= \frac{1}{5}$

4. a) If two lengths of rope, each x m long, are cut from a piece of rope y m long, what length is left? — **1**

$(y - 2x)$ m

b) What is the total distance covered in 3 hours at p km/h and t hours at n km/h — **1**

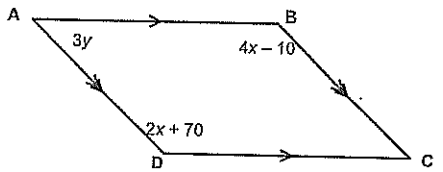
$3p + tn$

1 State 2 properties that would indicate definitely that a shape was a parallelogram — 2

* 2 pairs of parallel sides
* Opposite sides are equal
* Opposite angles are equal
* Diagonals bisect each other

} any 2

2 Find the value of the angles indicated. Give reasons. — 4



$2x + 70 = 4x - 10$ (opposite angles of a parallelogram are equal)

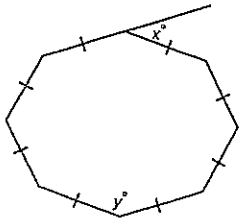
$x = 40$

$3y + 40 = 180°$ (co-interior angles, AB // DC)

$3y = 140$

$y = 46\frac{2}{3}°$

3 Find x and y, giving reasons — 4



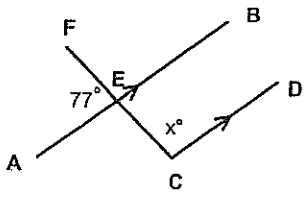
$[180 - (8 \times 2)] \div 8 = 135$

$y = 135°$ (interior angle of an octagon)

$x = 180° - 135°$ (supplementary angles)

$x = 45°$

4 Given that AB is parallel to CD, find x giving reasons — 2



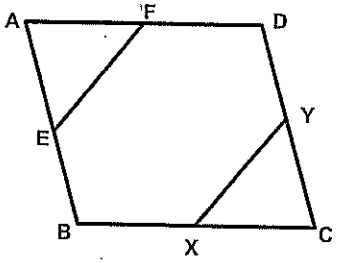
$\angle AEF = \angle BEC = 77°$ (vertically opposite angles)

$\angle BEC + \angle ECD = 180°$ (co-interior angles, AB // CD)

$77° + x = 180°$

$x = 103°$

5 Given that AF = XC, AE = CY and ABCD is a parallelogram, Prove that $\Delta AEF \equiv \Delta XCY$ — 3



In ΔAFE and ΔCYX

* $AF = XC$ (given)
* $AE = CY$ (given)
* $\angle EAF = \angle XCY$ (opposite angles in a parallelogram are equal)

$\therefore \Delta AFE \equiv \Delta CYX$ (SAS)

1. A card is to be chosen at random from a standard deck of 52. Find the probability that is will be:

a) the 9 of hearts $\frac{1}{52}$ — 1

b) a spade $\frac{13}{52} = \frac{1}{4}$ — 1

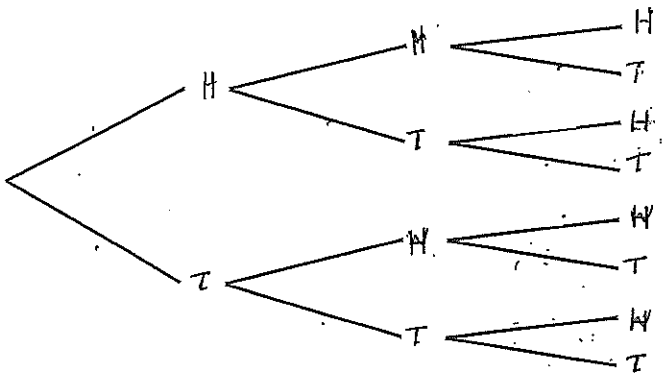
b) an ace or a heart $\frac{15}{52}$ — 1

2. The probability of a certain iphone being faulty is $\frac{1}{2000}$. If 50000 of these iphones are produced, how many would you expect to be faulty? — 1

$\frac{1}{2000} \times 50000 = 25$

3. A coin is tossed three times.

(i) Complete the tree diagram — 1



Find the probability of getting:

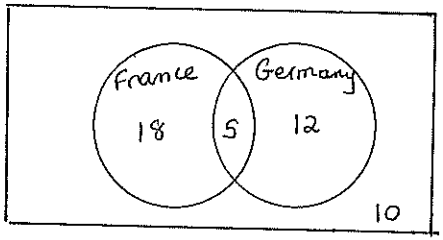
(ii) Three heads. $\frac{1}{8}$ — 1

(iii) Two heads. $\frac{3}{8}$ — 1

(iv) At least one tail $\frac{7}{8}$ — 1

4. In a group of 45 students, 23 have visited France, 17 have visited Germany and 10 students have been to neither country.

a) Draw a Venn Diagram to illustrate this information — 2



b) If one student is selected at random, what is the probability they have visited both France and Germany? — 1

$\frac{5}{45} = \frac{1}{9}$

5. If two dice are rolled and the possible results recorded in the table, find the probability of rolling

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

a) the sum of the numbers on the two dice is greater than 8 $\frac{10}{36}$ — 1

b) a 6 showing at least on one dice. $\frac{11}{36}$ — 1

☺ End of Examination ☺