Sydney Technical High School

Year 10

Assessment Task 1 – Term 2 2010



MATHEMATICS

Time allowed-seventy minutes

Directions to students:

- Attempt all questions.
- All questions are of equal value.
- Necessary working should be shown.
- Marks may not be awarded for untidy and/or disorganisd work.
- · Board approved calculators may be used.
- Ensure you have filled in your solution booklet details correctly

Name: Teacher:

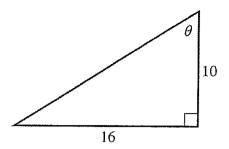
Qu 1	Qu 3	Qu 4	Qu 5	Total
				/60

Question One

12 Marks

1

a) Find the angle θ to the nearest degree.



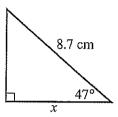
b) Wally is a casual worker, who is paid \$296.64 for 24 hours' work.i) Calculate Wally's hourly rate of pay.	
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ii) Calculate the number of hours that Wally will need to work to earn more than \$450.00.	2

c)	Solve the following quadratic equations that are expressed in factorised form. i) $(x-6)(x+2) = 0$	-
		••••••••••

	ii) $ (2x + \frac{1}{3})(-5x + 40) = 0 $	2
		••••
d)	Georgio buys 6 rose bushes and 5 daisy plants for \$57.25. Thomas buys 3 rose bushes and daisy plants for \$40.50. Find the total cost for one daisy plant and one rose plant.	12 4
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a) Calculate the length of the side (labelled x) in the following triangle, correct to 1 decimal place.



b) A rectangle has an area of $72m^2$. Its length is 6m more than its breadth. Letting the short side be x, form a quadratic equation to solve the equation

3

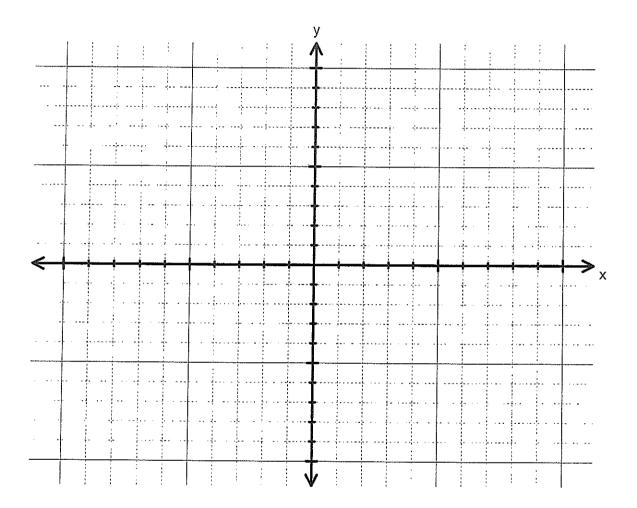
c)	Solve the equation $2(x-5)^2 - (x-5) - 15 = 0$.	3
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d)	Solve the following pair of simultaneous equations using the substitution method. $4x - y = 34$	4
	3x - 4y = 32	
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Solve the following pair of simultaneous equations using a graphical method. y = 5 - 2x

3

y = 2x - 7 (Marking the point of intersection)



b) Jonathan borrowed \$12 500 from the bank to buy a car. Simple interest is charged on the loan at a rate of 8.5% per annum over 5 years. How much interest did Jonathan pay? 2

b)	Na	relle and Paula are captains for a game of basketball. There are 12 other players and it is relle and Paula's job to pick teams by alternately selecting one player at random from the naining group. Paula has first pick.
	i)	Are the events 'Danielle is picked by Paula' and 'Danielle is picked by Narelle' independent?
	ii)	What is the probability that Danielle is not picked first by Paula?
	iii)	If Danielle is not picked by Paula what is the probability that she is then picked by Narelle with her first selection?
a)		um was on a raft at sea observing a lighthouse on a vertical cliff at an angle of elevation of °. The cliff was 165 m high. Draw a diagram using x to indicate the horizontal distance from Sam to the base of the cliff. 2
	ii)	Calculate the horizontal distance from Sam to the base of the cliff to the nearest metre.
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Question Four 12 Marks

a)	A hel	licopter flies 30 km in a direction of N47°E. How far east of the starting point is it, ct to 2 decimal places?	3
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b)	Luig	gi is paid a base wage of \$280 per week as well as 10% of his sales.	
	i)	How much would Luigi earn in a week if he sold \$1345 worth of merchandise?	2
	ii) 	How much merchandise would Luigi need to sell to earn \$98.50 commission?	2
	iii) 	How much merchandise would he need to sell to earn a total of \$468 in a week?	2
	*******		••••

c)	In a bag there are three balls, one green, one blue and one yellow. In a second bag there are two balls, one red and one green. One ball is chosen from each bag. 3
	i) Draw a tree diagram to show all possible colour combinations that may be selected.
i	i) Find the probability that two green balls are selected.
i	ii) What is the probability of at least one of the balls selected being green?

a)	Solve the following quadratic equation $x^2 - 9x + 14 = 0$ using the quadratic formula.	3

		•••••
b)	Emma works as a butcher. She is paid \$12.56 per hour for a 38-hour working week. If Emma works overtime the first four hours are paid at time-and-a-half and the remainder a double time. Calculate Emma's wage in a week where she works 44 hours.	at 4
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c) A two-way table is used to display the results of a test conducted on a new method of detecting if an unborn baby has a gene making it vulnerable to a cancer. To verify the test, it is conducted on 1000 unborn babies each of whom is known to either have or not have the gene.

	Positive	Negative	Total
With the gene	186	14	
Without the gene	65	735	
Total			

i) Complete the table.	1
ii) How many false positives were recorded?	1
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ii) If a person is selected at random from this group find the probability that the unborn bab i) has the gene	y: 1
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	••
ii) tested positive to the gene.	1
	•
iii) If an unborn baby has the gene what is the probability that it goes undetected by the new procedure?	1
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Sydney Technical High School

 $\begin{array}{c} Year \ 10 \\ Assessment \ Task \ 1-Term \ 2 \end{array}$



MATHEMATICS

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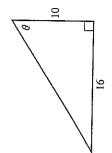
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12 Marks

a) Find the angle θ to the nearest degree.



Wally is a casual worker, who is paid \$296.64 for 24 hours' work. i) Calculate Wally's hourly rate of pay. <u>(</u>

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ii) Calculate the number of hours that Wally will need to work to earn more than \$450.00.

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c) Solve the following quadratic equations that are expressed in factorised form. i) (x-6)(x+2)=0

$$(x-6)(x+2)=0$$

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daisy plants for \$40.50. Find the total cost for one daisy plant and one rose plant.	Georgio buys 6 rose bushes and 5 daisy plants for \$57.25. Thomas buys 3 rose bushes and 12

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Question Two

12 Marks

Calculate the length of the side (labelled x) in the following triangle, correct to 1 decimal place.



-5) $-15 = 0$.
$1 2(x-5)^2 - (x-$
Solve the equation
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Solve the following pair of simultaneous equations using the substitution method, 4x - y = 34ਚ

$$3x - 4y = 32$$

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Page 5 Year 10 #1 -2010

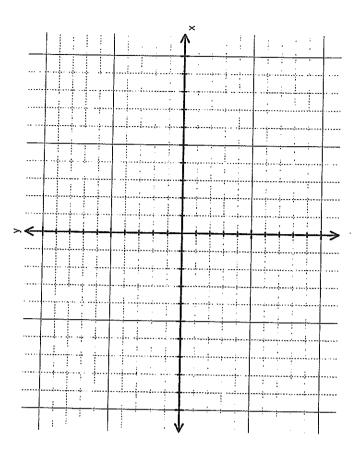
Question Three

12 Marks

3

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Jonathan borrowed \$12 500 from the bank to buy a car. Simple interest is charged on the loan at a rate of 8.5% per annum over 5 years. How much interest did Jonathan pay? <u>a</u>

Year 10 #1 -2010

Page 6

Year 10 #1 -2010 Page 7	ar 1(
) Calculate the horizontal distance from Sam to the base of the cliff to the nearest metre.	. 5
Sam was on a raft at sea observing a lighthouse on a vertical cliff at an angle of elevation of 31°. The cliff was 165 m high. i) Draw a diagram using x to indicate the horizontal distance from Sam to the base of the cliff. 2	a) S 3
iii) If Danielle is not picked by Paula what is the probability that she is then picked by Narelle with her first selection?	pine + pm, +
What is the probability that Danielle is not picked first by Paula?	ii)
Are the events 'Danielle is picked by Paula' and 'Danielle is picked by Narelle' independent?	i)
Narelle and Paula's job to pick teams by alternately selecting one player at random from the remaining group. Paula has first pick.	3 7 3

9

a)	Qı
A helicopter flies 30 km in a direction of N47°E. How far east of the starting point is it,	Question Four
How far east of the starting point is it,	12 M

estion Four	12 Mi
A helicopter flies 30 km in a direction of N47°E. How far east of the starting point is it, correct to 2 decimal places?	How far east of the starting point is it,

; : 5
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Year 10 #1 -2010

Page 8

 In a bag there are three balls, one green, one blue and one yellow. In a second bag there are two balls, one red and one green. One ball is chosen from each bag. 	Question Five	
 i) Draw a tree diagram to show all possible colour combinations that may be selected. 	a) Solve the following quadratic equation $x^2 - 9x +$	cequation $x^2 - 9x +$

ii) Find the probability that two green balls are selected.		
iii) What is the probability of at least one of the balls selected being green?	b) Emma works as a butcher. She is paid \$12.56 per Emma works overtime the first four hours are paid double time. Calculate Emma's wage in a week w	is paid \$12.56 per t four hours are paid s wage in a week w

Year 10 #1 -2010 Page 9

12 Marks

Solve the following quadratic equation $x^2 - 9x + 14 = 0$ using the quadratic formula. 3

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	Positive	Positive Negative Total	Total
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Without the gene	65	735	
Total			

	With the gene	186	14		
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i) Complete the table.	Ġ.				
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27.16					
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iii) If an unborn bal new procedure?	iii) If an unborn baby has the gene what is the probability that it goes undetected by the new procedure?	at is the pro	obability th	at it goes 1	undetected by the

Year 10 #1 -2010

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Sydney Technical High School

Year 10

Assessment Task 1 – Term 2 2010



MATHEMATICS

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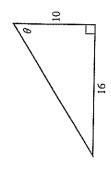
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Question One

12 Marks

a) Find the angle θ to the nearest degree.



Wally is a casual worker, who is paid \$296.64 for 24 hours' work. i) Calculate Wally's hourly rate of pay.

5

396.64 - 24 = \$ 13.36

ii) Calculate the number of hours that Wally will need to work to earn more than \$450.00. 2

450 - 12.36 = 36.41

Wally needs to work 31 hours to earn mose tham

Solve the following quadratic equations that are expressed in factorised form. ((x-6)(x+2)=0

Year 10 #1 -2010

Page 3

۳ $(2x + \frac{1}{3})(-5x + 40) = 0$ -5x+40=0 8 = X -50c=-40 a marks for .1 mark for both solution

9 Georgio buys 6 rose bushes and 5 daisy plants for \$57.25. Thomas buys 3 rose bushes and 12 daisy plants for \$40.50. Find the total cost for one daisy plant and one rose plant.

1 rose + 1 daisy 21 + y = 8.50 + 1.25 = \$ 9.75	8x + 5, 60; + 5	2 66	x = 1 ros.e 6x+5y = \$57.25 — (1) y = 1 daisy 3x + lay = \$40.50 — (2)
-	-25 25	— (i) — (a)	37.25 — (1) b.40.50 — (2) Imark fo
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Question Two

12 Marks

place. Calculate the length of the side (labelled x) in the following triangle, correct to 1 decimal



 $\cos 47^{\circ} = \frac{7}{8.7}$ = 5.9 cm 21 = 8.7 × cos 47° mark for solution mask

A rectangle has an area of $72m^2$. Its length is 6m more than its breadth. Letting the short side be x, form a quadratic equation to solve the equation

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Page 4	3.00	Year 10 #1 -2010
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	$x^2 + 6x - 7a = 0$	7235
		(3c+6) m

-(x-5)-15=0.
5)2 (
2(x-5)
Solve the equation
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$$\lambda_{t} t m = x-5$$

$$\lambda_{t} - m - 15 = 0$$

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$$\lambda_{t} - 5 = -\frac{5}{2} \quad m = 3$$

$$\lambda_{t} - 5 = -\frac{5}{2} \quad x - 5 = 3$$

$$\lambda_{t} - 5 = -\frac{5}{2} \quad x - 5 = 3$$

d) Solve the following pair of simultaneous equations using the substitution method. 4x - y = 34

$$4x - y = 34$$
$$3x - 4y = 32$$

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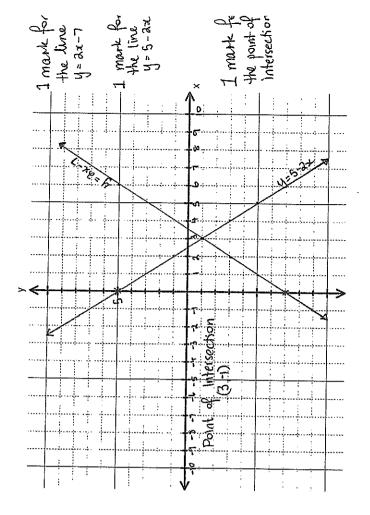
$$u = 4 \times x - 34$$
 $u = 4 \times 8 - 34$
 $u = 4 \times 8 - 34$
 $u = 3 \times - 34$

Question Three

12 Marks

a) Solve the following pair of simultaneous equations using a graphical method. y = 5 - 2x

y = 2x - 7 (Marking the point of intersection)



b) Jonathan borrowed \$12 500 from the bank to buy a car. Simple interest is charged on the loan
at a rate of 8.5% per annum over 5 years. How much interest did Jonathan pay?

P= (2 500	T=8.5%-10.03	n=5
I = 5×0.085 × 12500	= \$5319-50	

Page 5

- 9 Narelle and Paula are captains for a game of basketball. There are 12 other players and it is Narelle and Paula's job to pick teams by alternately selecting one player at random from the remaining group. Paula has first pick.
- Are the events 'Danielle is picked by Paula' and 'Danielle is picked by Narelle independent? S

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Planielle is not picked by Paula) = 11	ii) What is the probability that Danielle is not picked first by Paula?

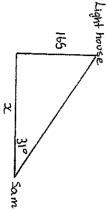
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iii) If Danielle is not picked by Paula what is the probability that she is then picked by Narelle with her first selection?

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- B Sam was on a raft at sea observing a lighthouse on a vertical cliff at an angle of elevation of 31° The cliff was 165 m high.
- the cliff. Draw a diagram using x to indicate the horizontal distance from Sam to the base of



۳ Calculate the horizontal distance from Sam to the base of the cliff to the nearest

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tom 31°	57
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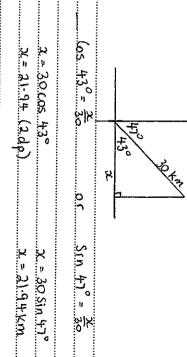
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z = 275°

Question Four

12 Marks

A helicopter flies 30 km in a direction of N47°E. How far east of the starting point is it, correct to 2 decimal places?

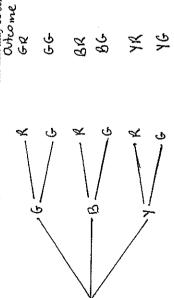


- ত Luigi is paid a base wage of \$280 per week as well as 10% of his sales
- 280+ 0·10 x \$1345 280 + 134.50 How much would Luigi earn in a week if he sold \$1345 worth of merchandise?
- ≅ 98.50 - 0.1 = \$985 How much merchandise would Luigi need to sell to earn \$98.50 commission?
- ₿ 468 - 280 01 x 88 How much merchandise would he need to sell to earn a total of \$468 in a week? -\$188 = \$1880

Year 10 #1 -2010

Page 8

i) Draw a tree diagram to show all possible colour combinations that may be selected.



Plat least one green = 4

ii) Find the probability that two green balls are selected.

iii) What is the probability of at least one of the balls selected being green?

Question Five

Solve the following quadratic equation $x^2 - 9x + 14 = 0$ using the quadratic formula. ð

12 Marks

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3 - 41 + 14 = 0	~ (T	سف.		2	7 2 2 7		***************************************

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tionis.		mark	I mark	lmark	Imark
44 hours = 38 + 4 + 2	Normal times a devole	38 x 13.56 = 477.28	4 x 1 x x 12.56 = 75.36 mark	2 x 2 x 12-56 = 50.24+	\$8.409\$

Year 10 #1 -2010

c) A two-way table is used to display the results of a test conducted on a new method of detecting if an unborn baby has a gene making it vulnerable to a cancer. To verify the test, it is conducted on 1000 unborn babies each of whom is known to either have or not have the gene.

735 740		Positive	Positive Negative Total	Total
out the gene 65 735 351 749	With the gene	186	14	200
J51	Without the gene	65	735	800
	Total	251	749	1000

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ii) How many	
false positives	
s were recorded?	

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ii) If a person is selected at random from this group find the probability that the unborn baby:i) has the gene

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new procedure?	iii) If an unborn baby has the gene what is the probability
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Sydney Technical High School

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MATHEMATICS

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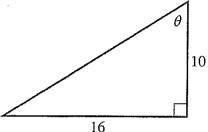
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Question One

12 Marks

a) Find the angle θ to the nearest degree.





tan	$\theta = \frac{16}{10}$	10	
	A = 5%°		

b) Wally is a casual worker, who is paid \$296.64 for 24 hours' work.
i) Calculate Wally's hourly rate of pay.

ii) Calculate the number of hours that Wally will need to work to earn more than \$450.00. 2

450 =	·12·36	<u> </u>	36:41	 	 	
Wally 1						
\$450				 		

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i)
$$(x-6)(x+2) = 0$$
 1
 $x = 6$ $x = -2$

ii)	$(2x + \frac{1}{3})(-5x + 40) = 0$
-----	------------------------------------

ii) $(2x + \frac{1}{3})(-5)$	(x+40)=0	2
$2x + \frac{1}{3} = 0$	-5x+40=0	I mark for
225 = 1	-5>L=-40	I mark for one solution a marks for both solution
X =	1 x = 8	2 marks for
		both solution

d) Georgio buys 6 rose bushes and 5 daisy plants for \$57.25. Thomas buys 3 rose bushes and 12 daisy plants for \$40.50. Find the total cost for one daisy plant and one rose plant.

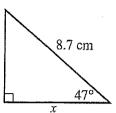
x = 1 rose	6x + 5y = \$57.25 - c	
y= 1 daisy		2)
J		I mark for
		simultaneous
	67c+54 = \$57.25 - (1) equations
	62 + 244 = 981·00 - 13	1 1
	-194 = -\$23.75	I mark for
	y = 1·25	
	Sub into ()	
	Bx + 5y = \$57.25	
	60C+5×1.25 = \$57-25	
	6x+6.25 = \$57.25	I mark for
	6 oc = \$51	x '
	ol = \$8.50	
Irose + I daisy		
31 + 4 =		II made la
1 rose + 1 daisy 31 + y = 8.50 + 1.25 = \$9.75		I mark for Solution

Question Two

12 Marks

2

a) Calculate the length of the side (labelled x) in the following triangle, correct to 1 decimal place.



$\cos 47^{\circ} = \frac{3c}{8.7}$	1 mask
2c = 8.7 × cos 47°	
= 5.9 cm	I mark for solution

b) A rectangle has an area of $72m^2$. Its length is 6m more than its breadth. Letting the short side be x, form a quadratic equation to solve the equation

3

72m - 2	$x^2 + 6x - 72 = 0$	
b d	$3c = -6 \pm \sqrt{6^2 - 4 \times 1 \times 72}$	I mark for equation
oc (oc+6) = 12	$x = -6 \pm \sqrt{36 + 288}$	equation
$x^2 + bx = 72$ (x1+3) ² = 72 + 9	0R 2(=-6±√324	
$(3c+3)^{2} = 81$	2	I mark for length
$x + 3 = \pm \sqrt{81}$ $x = \pm 9 - 3$	3c = -6 - 18	length
x = 6	x = 6	1 mark for breadth
工 半 - 1 a	$x \neq -12$	breadth

Length of rectangle is by Breadth is 12m.

c)	Solve the equation	$2(x-5)^2 - (x-5) - 15 = 0$).
----	--------------------	-----------------------------	----

Let m = x - 5 $2m^2 - m - 15 = 0$

(2m+5)(m-3)=0m=-5 m=3

 $x-5=\frac{1}{2}$ $x=2\frac{1}{2}$ x=8

d) Solve the following pair of simultaneous equations using the substitution method.

$$4x - y = 34$$
$$3x - 4y = 32$$

4x - y = 34y = 4x - 34

3x - 4y = 323x - 4(4x - 34) = 32

-13x = -104

x = 8

 $y = 4 \times 8 - 34$ y = 32 - 34 y = 32 - 34

y=-2

3

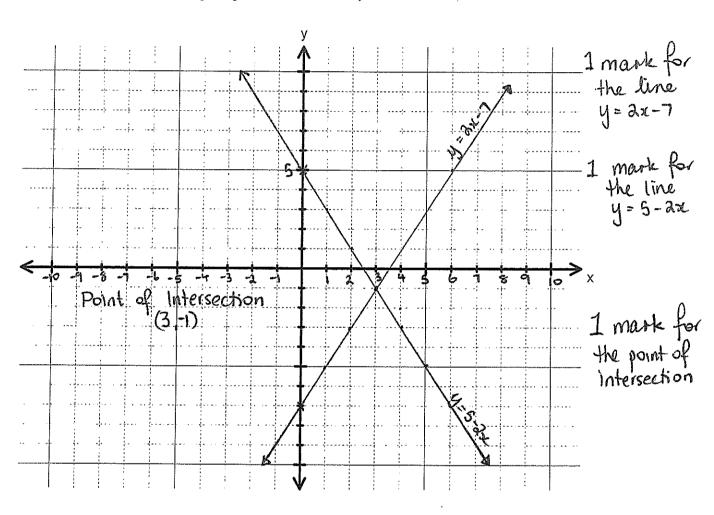
Question Three

12 Marks

a) Solve the following pair of simultaneous equations using a graphical method. y = 5 - 2x

3

y = 2x - 7 (Marking the point of intersection)



b) Jonathan borrowed \$12 500 from the bank to buy a car. Simple interest is charged on the loan at a rate of 8.5% per annum over 5 years. How much interest did Jonathan pay? 2

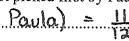
I = 5 × 0.085 × 12500	P=12500
= \$5312-50	τ= 8·5% → 0·085

Narelle and Paula are captains for a game of basketball. There are 12 other players and it is Narelle and Paula's job to pick teams by alternately selecting one player at random from the remaining group. Paula has first pick.

3

i) Are the events 'Danielle is picked by Paula' and 'Danielle is picked by Narelle' independent? lmark

P(Danielle is not picked by Paula) = 11 1 mark ii) What is the probability that Danielle is not picked first by Paula?

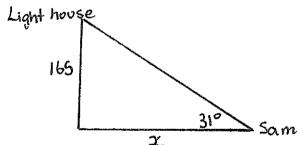


iii) If Danielle is not picked by Paula what is the probability that she is then picked by Narelle with her first selection?

D(Danielle is picked by Narelle) = 1 mark

a) Sam was on a raft at sea observing a lighthouse on a vertical cliff at an angle of elevation of 31°. The cliff was 165 m high. i)

Draw a diagram using x to indicate the horizontal distance from Sam to the base of the cliff. 2



ii) Calculate the horizontal distance from Sam to the base of the cliff to the nearest

65 2 1 mark tan 31°=

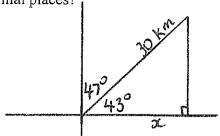
7 = 274.6 m x = 275° 1 mark by correct existing

Question Four

12 Marks

3

a) A helicopter flies 30 km in a direction of N47°E. How far east of the starting point is it, correct to 2 decimal places?



 $(\cos 43^{\circ} = \frac{2}{30})$ or $(\sin 47^{\circ} = \frac{2}{30})$

 $x = 30 \cos 43^{\circ}$ $x = 30 \sin 47^{\circ}$ x = 21.94 (2dp) x = 21.94 km

- b) Luigi is paid a base wage of \$280 per week as well as 10% of his sales.
 - i) How much would Luigi earn in a week if he sold \$1345 worth of merchandise? 2

 280+0:10 x \$1345

 280 + 134:50

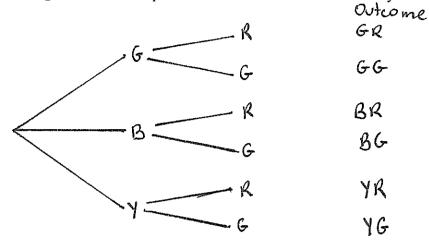
 = \$414.50
 - ii) How much merchandise would Luigi need to sell to earn \$98.50 commission? 2

 98.50 ÷ 0.1 = \$985
 - iii) How much merchandise would he need to sell to earn a total of \$468 in a week? 2

 468 280 = \$188

 188 × 10 = \$1880

- c) In a bag there are three balls, one green, one blue and one yellow. In a second bag there are two balls, one red and one green. One ball is chosen from each bag.
 3
 - i) Draw a tree diagram to show all possible colour combinations that may be selected.



ii) Find the probability that two green balls are selected.

P(G,G) = 6

iii) What is the probability of at least one of the balls selected being green?

Plat least	.one.	areen)	=	46	- >	<u>4</u> 3		
-	-	0						*********
	• • • • • • • • • • • • • • • • • • • •	·· <i>···</i>	- • • • • • • • •				******************************	

a) Solve the following quadratic equation $x^2 - 9x + 14 = 0$ using the quadratic formula. 3

	$x^{2} - 9z + 14 = 0$ $x = -b^{\frac{1}{2}} \sqrt{b^{2} - 4ac}$
8 = 1	$x = -b^{\frac{1}{2}}\sqrt{b^2 - 4ac}$
	ત્રવ
b=9	$3C = 9 - \sqrt{9^2 - 4 \times 1 \times 14}$
C= 14	2×1
	$3c = 9^{\frac{1}{2}} \sqrt{25}$
	2
	x = 2, 7

Emma works as a butcher. She is paid \$12.56 per hour for a 38-hour working week. If Emma works overtime the first four hours are paid at time-and-a-half and the remainder at double time. Calculate Emma's wage in a week where she works 44 hours.

44 hours = 38	+ 4	+ 2	
Norma	l time a ha	a double	
38 x 12·56	= 477.a	8	lmark
4 x 1 2 x 12.56	= 75.3	6	Imark
2 x 2 x 12.56	= <u>50-</u> 2	<u> </u>	l mark
	\$602.	8 8	Imark

c) A two-way table is used to display the results of a test conducted on a new method of detecting if an unborn baby has a gene making it vulnerable to a cancer. To verify the test, it is conducted on 1000 unborn babies each of whom is known to either have or not have the gene.

	Positive	Negative	Total
With the gene	186	14	200
Without the gene	65	735	800
Total	251	749	1000

1) Complete the table.	1
ii) How many false positives were recorded?	1
65	
ii) If a person is selected at random from this group find the probability that the unborn baby i) has the gene	1
200 = 1 1000 5	•
ii) tested positive to the gene.	1
25 <u>1</u>	
	•
iii) If an unborn baby has the gene what is the probability that it goes undetected by the new procedure?	1
14 -> 7	
200 100	
O O OFFIN OF TWANTERSONO O	
☺ ☺ ☺ END OF EXAMNATION☺ ☺ ☺	

