Carlingford High School

Mathematics

Year 10 5.1 Course

Term 3 Exam

2015

Name: _____

Class: 10MA11

Teacher: Mr Fardouly

Time allowed: 55 minutes

Topic	Probability	Algebraic Expressions	Trigonometry	Total	
Mark	/20	/40	/15	/75	%

Probability

1. The frequency of an event is 5 and the total number of frequencies is 40. What is the relative frequency?

   A 0.125 **B** 0.05

   C 0.80 **D** 0.875

2. One card is selected from cards labelled 11, 12, 13, 14, 15, 16, 17 and 18. What is the probability of selecting a number that is both odd and divisible by 3?

   A 12.5% **B** 50%

   C 75% **D** 100%

3. A letter is chosen at random from the word 'PICTON'.
   If the vowels are a, e, i, o and u, what is the probability that the letter will **not** be a consonant?

   A $\frac{1}{6}$ **B** $\frac{1}{3}$

   C $\frac{2}{3}$ **D** $\frac{5}{6}$

4. Thirty cards are numbered from 1 to 30. Find the probability of selecting:

   a) A number greater than 20.

   _____

   b) A number that is less than 50.

   _____

5. School-aged chidren at several shopping centres were asked how they travelled to school.

Mode of transport	Frequency
Walk	27
Bus	80
Car	62
Train	21
Bicycle	5
Skateboard	1
Other	4

   a) How many students were surveyed? _____

   b) Based on these results, find the probability that a student chosen at random will walk to school?

   _____

6. The number of crimes in two suburbs, C and D is recorded in the two-way table below.

	C	D	Total
House Robbery	29		42
Car Robbery	17	23	40
Total			

   a) Complete the table.

   b) What is the probability that the crime committed was a house robbery?

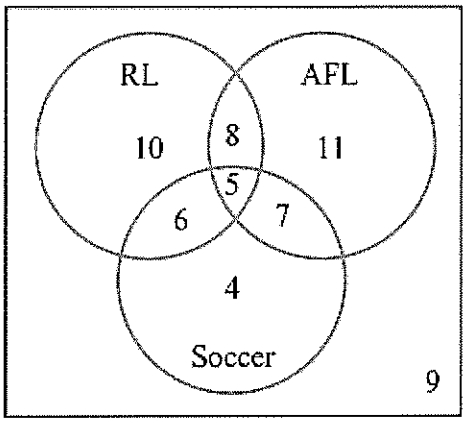
   _____

   c) What is the probability that in suburb C the crime was a car robbery?

   _____

7. The Venn diagram represents the results of a survey of 60 people that asked:

Which sports do you like to watch?



Calculate the probability that a person chosen at random from this group:

a) Likes rugby league.

_____

b) Likes rugby league but not soccer or AFL.

_____

c) Does not like any of these sports.

_____

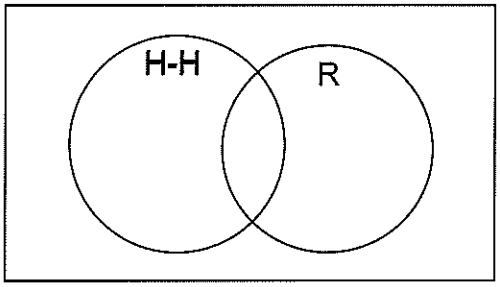
d) Likes rugby league or AFL or both.

_____

8. 30 people were surveyed on their favourite type of music. The results were:

- Hip-Hop -17
- Rock - 14
- Rock and Hip-Hop – 6

a) Show this information in a Venn diagram.



b) If one person was chosen at random, find the probability that they:

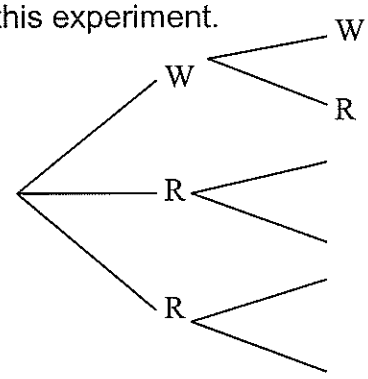
i) Like hip-hop but not rock

_____

(ii) Like hip-hop or rock but not both. _____

9. A bag contains 1 white and 2 red balls. Two balls are selected from the bag.

a) Complete the tree diagram for this experiment.



b) Find the probability that the:

i) First ball is red. _____

ii) Both balls are red. _____

Algebraic Expressions

1. $2x+3y+4x=$

A $6x+3y$ **B** $9xy$

C $5x+4y$ **D** $9x^2y$

2. $\frac{9mn}{3n}=$

A $3mn$ **B** 3

C $3m$ **D** $3n$

3. $4(n-2)+3n=$

A $5n$ **B** $7n-8$

C $7n-2$ **D** $8n-2$

4. Simplify:

a) $7p-p+4m=$ _____

b) $10a-3a=$ _____

c) $10a-3a=$ _____

d) $10x-(-2x)=$ _____

e) $3y^2+2y+4y^2=$ _____

f) $8t+4w-6t+2w=$ _____

5. Simplify:

a) $3\times 2xy=$ _____

b) $m\times 5\times n=$ _____

c) $10m\times(-3mn)=$ _____

d) $2k\times k+6k^2=$ _____

6. Simplify:

a) $\frac{12x}{4x}=$ _____

b) $\frac{6ab}{a}=$ _____

c) $\frac{4m}{20}=$ _____

d) $\frac{6k}{10}=$ _____

e) $\frac{6x^2}{3x}=$ _____

f) $\frac{6z}{-3}=$ _____

7. Expand:

a) $2(3a+2b)=$ _____

b) $4p(3q-2p)=$ _____

c) $4(n-2)+3n=$ _____

d) $-2m(m+4)=$ _____

e) $-6x(x-7)=$ _____

8. Factorise:

a) $2y+6=2(y+$ ___ $)$

b) $10-8k=$ ___ $(5-4k)$

c) $5x+10xy=$ ___ $($ ___ $+$ ___ $)$

d) $6pq-12q=$ _____

e) $2x^2+x=$ _____

9. Simplify:

a) $\frac{3m}{7}+\frac{2m}{7}=$ _____

b) $\frac{2}{a}-\frac{1}{a}=$ _____

d) $\frac{x}{2}\times\frac{x}{3}=$ _____

e) $\frac{a}{b}\times\frac{b}{a}=$ _____

10. If $a=1$, $b=2$ and $c=3$

a) $5a=$ _____

b) $ab-c=$ _____

c) $b^2c=$ _____

11. If $x=-1$, $y=5$ and $z=\frac{1}{2}$

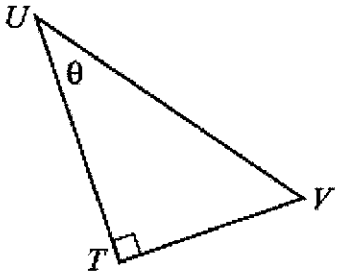
a) $\frac{x}{y}=$ _____

b) $y^2=$ _____

c) $3x-2y+z=$ _____

Trigonometry

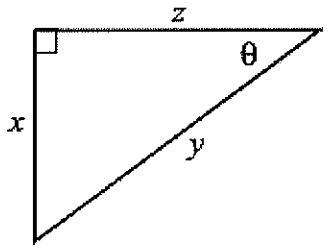
1. For the triangle below the hypotenuse is:



A UT **B** UV

C TV **D** none of these

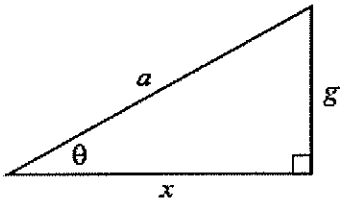
2. For the triangle below the side adjacent to θ is:



A z **B** y

C x **D** none of these

3. For the triangle below the expression for tan θ is:



A $\frac{g}{x}$ **B** $\frac{x}{g}$

C $\frac{g}{a}$ **D** $\frac{x}{g}$

4. 15tan68°23' =

A 37.126 **B** 37.853

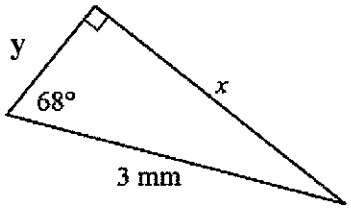
C 37.854 **D** 37.977

5. If cosθ = 0.75, θ =

A 41°24′ **B** 41°25′

C 48°34′ **D** 48°35′

6.



a) $\sin 68^\circ = \frac{x}{3}$

$x =$ _____

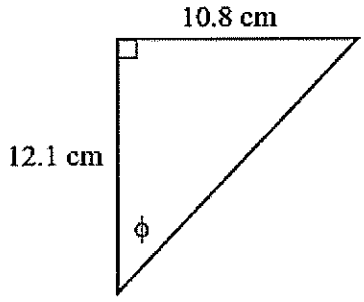
b) Find the value of y

_____

_____

7. For each triangle find the missing angle.

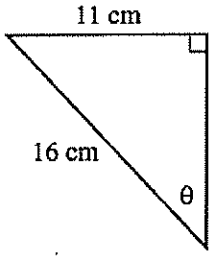
a)



$\tan\phi^\circ = \frac{10.8}{12.1}$

$\phi =$ _____

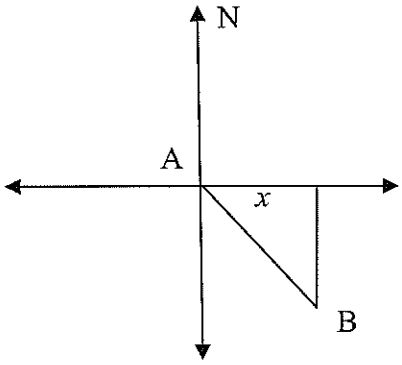
b)



_____

$\theta =$ _____

8. A rally driver travels 210 km on a bearing of 145°T from A to B.

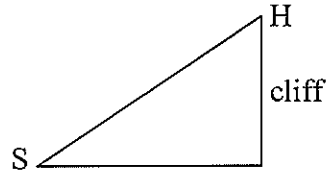


Find the value of x

_____

_____

9. A sailor (S) sights a house (H) on top of a cliff as shown.



a) Mark the angle of elevation with an *x*.

b) Mark the angle of depression with a *y*.

~ END OF TEST~

Carlingford High School

Mathematics

Year 10 5.1 Course

Term 3 Exam

2015

Name: SOLUTIONS.

Class: 10MA11

Teacher: Mr Fardouly

Time allowed: 55 minutes

Topic	Probability	Algebraic Expressions	Trigonometry	Total	
Mark	/20	/40	/15	/75	%

Probability

1. The frequency of an event is 5 and the total number of frequencies is 40. What is the relative frequency?

A 0.125 **B** 0.05

C 0.80 **D** 0.875

2. One card is selected from cards labelled 11, 12, 13, 14, 15, 16, 17 and 18. What is the probability of selecting a number that is both odd and divisible by 3? 1/8

A 12.5% **B** 50%

C 75% **D** 100%

3. A letter is chosen at random from the word 'PICTON'.
If the vowels are a, e, i, o and u, what is the probability that the letter will **not** be a consonant?

A $\frac{1}{6}$ **B** $\frac{1}{3}$

C $\frac{2}{3}$ **D** $\frac{5}{6}$

4. Thirty cards are numbered from 1 to 30. Find the probability of selecting:

a) A number greater than 20.

10/30 or 1/3

b) A number that is less than 50.

1

5. School-aged chidren at several shopping centres were asked how they travelled to school.

Mode of transport	Frequency
Walk	27
Bus	80
Car	62
Train	21
Bicycle	5
Skateboard	1
Other	4

a) How many students were surveyed? 200

b) Based on these results, find the probability that a student chosen at random will walk to school?

27/200 or 0.135

6. The number of crimes in two suburbs, C and D is recorded in the two-way table below.

	C	D	Total
House Robbery	29	13	42
Car Robbery	17	23	40
Total	46	36	82

a) Complete the table.

b) What is the probability that the crime committed was a house robbery?

42/82 or 21/41

51.2%

c) What is the probability that in suburb C the crime was a car robbery?

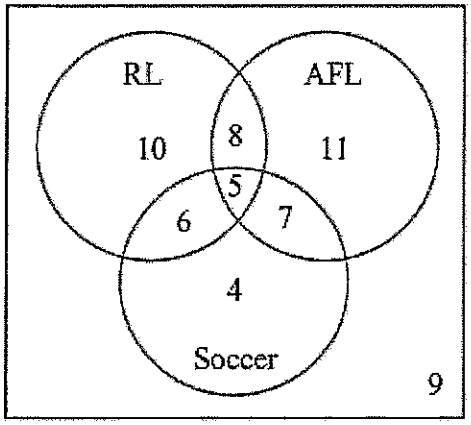
17/46

36.96%

10

7. The Venn diagram represents the results of a survey of 60 people that asked:

Which sports do you like to watch?



Calculate the probability that a person chosen at random from this group:

a) Likes rugby league.

48.3% 29/60 ✓

b) Likes rugby league but not soccer or AFL.

16.7% 10/60 or 1/6 ✓

c) Does not like any of these sports.

15% 9/60 or 3/20 ✓

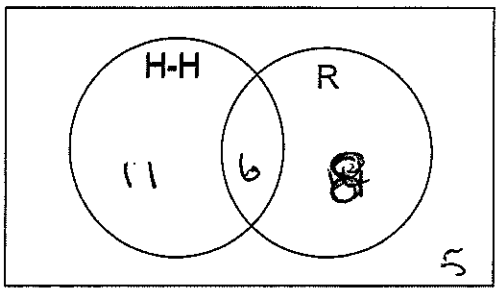
d) Likes rugby league or AFL or both.

78.3% 47/60 ✓

8. 30 people were surveyed on their favourite type of music. The results were:

- Hip-Hop -17
- Rock - 14
- Rock and Hip-Hop – 6

a) Show this information in a Venn diagram.



✓

b) If one person was chosen at random, find the probability that they:

i) Like hip-hop but not rock

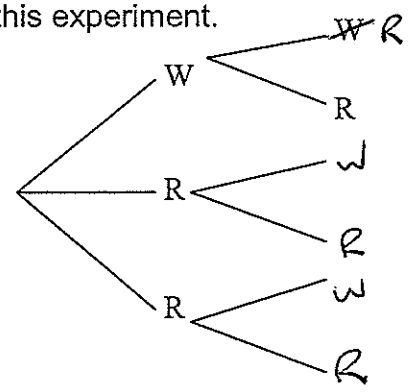
36.7% 11/30 ✓

(ii) Like hip-hop or rock but not both.

63.3% 19/30 ✓

9. A bag contains 1 white and 2 red balls. Two balls are selected from the bag.

a) Complete the tree diagram for this experiment.



✓

b) Find the probability that the:

i) First ball is red. 2/3 ✓

ii) Both balls are red. 2/6 or 1/3 ✓

Algebraic Expressions

1. $2x+3y+4x=$

(A) $6x+3y$ **B** $9xy$

C $5x+4y$ **D** $9x^2y$

2. $\frac{9mn}{3n}=$

A $3mn$ **B** 3

(C) $3m$ **D** $3n$

3. $4(n-2)+3n=$

A $5n$ (B) $7n-8$

C $7n-2$ **D** $8n-2$

4. Simplify:

a) $7p-p+4m=$ 6p+4m

b) $10a-3a=$ 7a

c) $10a-3a=$ 7a

d) $10x-(-2x)=$ 12x

e) $3y^2+2y+4y^2=$ $7y^2+2y$

f) $8t+4w-6t+2w=$ 2t + 6w

5. Simplify:

a) $3\times 2xy=$ 6xy

b) $m\times 5\times n=$ 5mn

c) $10m\times(-3mn)=$ $-30m^2n$

d) $2k\times k+6k^2=$ $8k^2$

6. Simplify:

a) $\frac{12x}{4x}=$ 3

b) $\frac{6ab}{a}=$ 6b

c) $\frac{4m}{20}=$ $\frac{1}{5}m$ or $\frac{m}{5}$

d) $\frac{6k}{10}=$ $\frac{3}{5}k$ or $\frac{3k}{5}$

e) $\frac{6x^2}{3x}=$ 2x

f) $\frac{6z}{-3}=$ $-2z$

7. Expand:

a) $2(3a+2b)=$ 6a+4b

b) $4p(3q-2p)=$ $12pq-8p^2$

c) $4(n-2)+3n=$ 7n-8

d) $-2m(m+4)=$ $-2m^2-8m$

e) $-6x(x-7)=$ $-6x^2+42x$

8. Factorise:

a) $2y+6=2(y+$ 3)

b) $10-8k=$ 2$(5-4k)$

c) $5x+10xy=$ 5x(1 + 2y)

d) $6pq-12q=$ 6q(p-2)

e) $2x^2+x=$ x(2x+1)

9. Simplify:

a) $\frac{3m}{7}+\frac{2m}{7}=$ $\frac{5m}{7}$ ✓

b) $\frac{2}{a}-\frac{1}{a}=$ $\frac{1}{a}$ ✓

d) $\frac{x}{2}\times\frac{x}{3}=$ $\frac{x^2}{6}$ ✓

e) $\frac{a}{b}\times\frac{b}{a}=$ 1 ✓

10. If $a=1$, $b=2$ and $c=3$ (✓ for $\frac{ab}{ba}$ only)

a) $5a=$ 5 ✓

b) $ab-c=$ -1 ✓

c) $b^2c=$ 12 ✓

11. If $x=-1$, $y=5$ and $z=\frac{1}{2}$

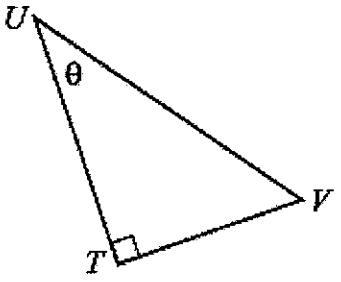
a) $\frac{x}{y}=$ $-\frac{1}{5}$ or -0.2 ✓

b) $y^2=$ 25 ✓

c) $3x-2y+z=$ $-12\frac{1}{2}$ ✓

Trigonometry

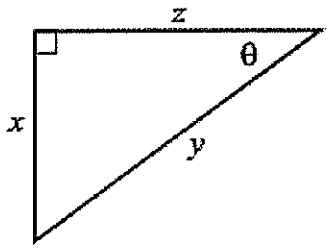
1. For the triangle below the hypotenuse is:



A UT **B** UV ✓

C TV **D** none of these

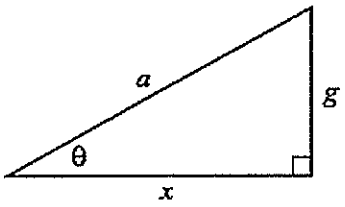
2. For the triangle below the side adjacent to θ is:



A z **B** y ✓

C x **D** none of these

3. For the triangle below the expression for tan θ is:



A $\frac{g}{x}$ **B** $\frac{x}{g}$ ✓

C $\frac{g}{a}$ **D** $\frac{x}{g}$

11 3

4. 15tan68°23' =

A 37.126 **B** 37.853

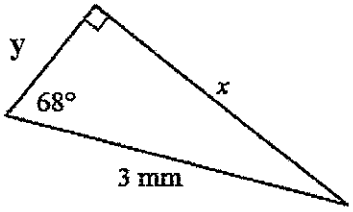
C 37.854 **D** 37.977

5. If cosθ = 0.75, θ =

A 41°24′ **B** 41°25′

C 48°34′ **D** 48°35′

6.



a) $\sin 68° = \frac{x}{3}$

$x =$ 2.78...

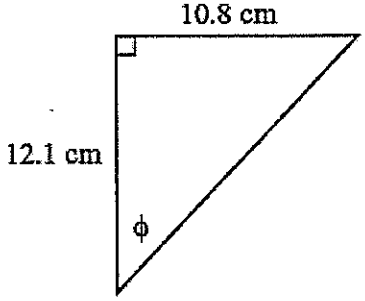
b) Find the value of y

$y^2 = 3^2 - 2.78^2$ or $\cos 68° = \frac{y}{3}$

$y = 1.12$ $y = 1.12...$

7. For each triangle find the missing angle.

a)



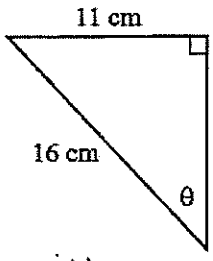
$\tan\phi° = \frac{10.8}{12.1}$

$\phi =$ 41.75°

or 41°45'

or 42°

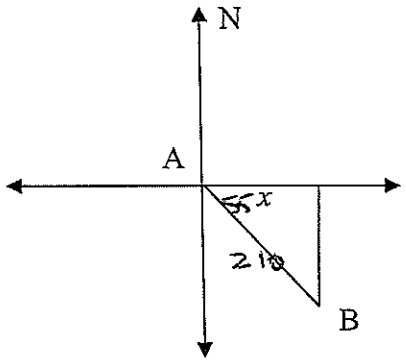
b)



$\sin\theta = 11/16$

$\theta =$ 43°26' or 43° or 43.43°.

8. A rally driver travels 210 km on a bearing of 145°T from A to B.

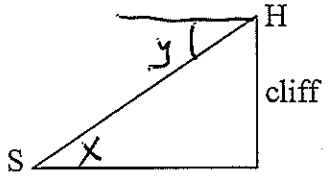


Find the value of x

$\cos 55° = x/210$

$x = 120.45$ km

9. A sailor (S) sights a house (H) on top of a cliff as shown.



a) Mark the angle of elevation with an *x*.

b) Mark the angle of depression with a *y*.

~ END OF TEST~