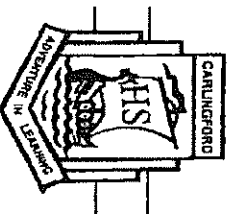


Carlingford High School



Year 10 (5.2) Mathematics Yearly Exam 2017

Name: _____ Class: 10Ma5.2 _____

Please circle your teacher's name:

Ms Willson/Mrs Young

Mrs Lobejko

Mr Jiang

- Time allowed: *90 minutes*
- Board approved calculators may be used
- Show all necessary working using blue or black pen
- Marks may be deducted for untidy setting out

TOPIC	STANDARD	EXTENSION(*)	TOTAL
Multiple Choice	/25		/25
Linear Relationships	/5	/2	/7
Data Analysis	/5	/2	/7
Compound Interest	/5	/2	/7
Trigonometry	/5	/2	/7
Algebra	/5	/2	/7
Probability	/5	/2	/7
Surface Area and Volume	/5	/2	/7
Equations and Inequations	/5	/2	/7
Geometry	/5	/2	/7
Graphs	/5	/2	/7
Simultaneous Equations	/5		/5
TOTAL	/75	/20	/100

Multiple Choice – Answer on the answer sheet provided.

Suggested time 20 minutes, 25 marks.

1. The equation of the line through $(-3,4)$ parallel to the y axis is

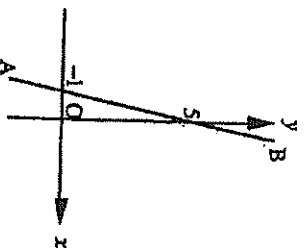
- A. $x = -3$ C. $y = -3$
 B. $x = 4$ D. $y = 4$

2. Which point lies on the line $7x-3y-10=0$?

- A. $(-2,-8)$ C. $(-1,-1)$
 B. $(1,1)$ D. $(2,8)$

3. What is the equation of the line AB ?

- A. $y = \frac{1}{5}x - 1$
 B. $y = \frac{1}{5}x + 5$
 C. $y = 5x - 1$
 D. $y = 5x + 5$

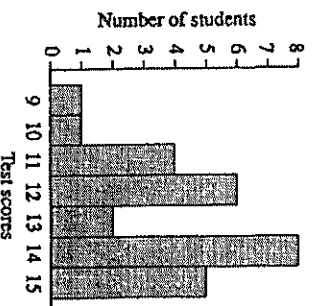


4. For this set of scores which of the following statements is correct?

Score	Frequency
5	3
6	1
7	2
8	7

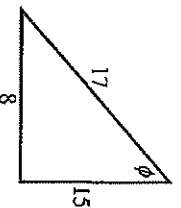
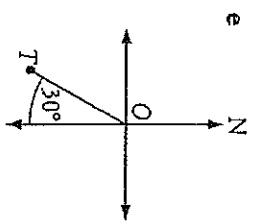
- A. There are 4 scores and their mean is 6.5.
 B. There are 4 scores and their mean is 7.
 C. There are 13 scores and their mean is 6.5.
 D. There are 13 scores and their mean is 7.

5. The results of a Year 10 class test are shown in the frequency histogram below:



The median test score is:

- A. 11
 B. 12
 C. 13
 D. 14

<p>6. The greatest return on a compound interest investment will be made if interest is:</p> <p>A. compounded monthly B. compounded quarterly C. compounded six-monthly D. compounded yearly</p>	
<p>7. A bottle of soft drink costs \$2.50. If the inflation rate is predicted to average 2%p.a. for the next 5 years, the cost of the soft drink in 5 years will be:</p> <p>A. \$2.60 B. \$2.75 C. \$2.70 D. \$2.76</p>	
<p>8. Matthew receives a normal hourly rate of \$22.60 per hour. What is his pay when he works 8 hours at a normal rate and 3 hours at time-and-a half?</p> <p>A. \$180.80 B. \$282.50 C. \$248.60 D. \$316.40</p>	
<p>9. Which of the following is correct?</p> <p>A. $\tan \phi = \frac{8}{15}$ B. $\tan \phi = \frac{15}{8}$ C. $\sin \phi = \frac{15}{17}$ D. $\cos \phi = \frac{8}{17}$</p> 	
<p>10. What is the bearing of T from O?</p> <p>A. 150° B. 030° C. 330° D. 210°</p> 	
<p>11. Which of the following is NOT correct?</p> <p>A. the value of $\tan \theta$ can never be greater than 1 B. the value of $\sin \theta$ can never be greater than 1 C. the value of $\cos \theta$ can never be greater than 1 D. $\tan 45^\circ = 1$</p>	

12. The expression $x^2 + 5x - 6$ can be factorised to give

- A. $(x + 3)(x + 2)$ C. $(x - 3)(x - 2)$
B. $(x - 6)(x + 1)$ D. $(x + 6)(x - 1)$

13. $(x + 2)$ is a factor of the expression:

- A. $x^2 + 4x - 3$ C. $x^2 - 4x + 4$
B. $x^2 - 4$ D. $x^2 + x - 6$

14. A letter is chosen from the word HAPPINESS. What is the probability that the chosen letter is NOT a vowel?

- A. $\frac{1}{3}$ C. $\frac{2}{3}$
B. $\frac{1}{9}$ D. $\frac{2}{9}$

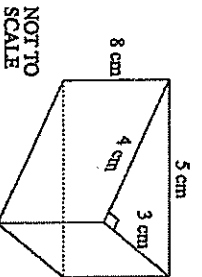
15. One card is selected from a regular deck of playing cards. What is the probability that it is a heart?

- A. $\frac{1}{52}$ C. $\frac{1}{13}$
B. $\frac{1}{4}$ D. $\frac{3}{4}$

16. A bag contains red, white and blue balls. The probability of choosing a red ball is 0.2 and the probability of choosing a white ball is 0.7. What is the probability of choosing a blue ball?

- A. 0.1 C. 0.27
B. 0.72 D. 0.9

17. The volume of this triangular prism is:



- A. 48cm^3
B. 60cm^3
C. 80cm^3
D. 96cm^3

18. The volume of a cylinder with a height of 6cm and radius of 2cm is:

- A. 75cm^3 C. 113cm^3
B. 302cm^3 D. 452cm^3

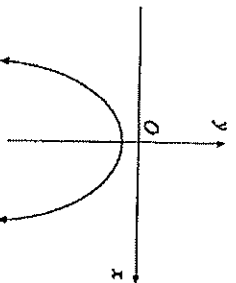
19. A number x is decreased by 7, then this amount is doubled. The result is 85.
Which of these equations represents this?

- A. $7 - 2x = 85$
- B. $2(7 - x) = 85$
- C. $2x - 7 = 85$
- D. $2(x - 7) = 85$

20. Solve $5 - 3x < 11$

- A. $x < -2$
- B. $x < 2$
- C. $x > -2$
- D. $x > -2$

21. The equation of this graph could be:



- A. $y = -x^2 + 3$
- B. $y = -x^2 - 3$
- C. $y = x^2 + 3$
- D. $y = x^2 - 3$

22. The graph represented by the equation $x^2 + y^2 = 9$ would be:

- A. a straight line
- B. a parabola
- C. a circle
- D. an exponential curve

23. The exterior angle sum any polygon is:

- A. 90°
- B. 360°
- C. 180°
- D. 540°

24. The number of sides on a hexagon is:

- A. 5
- B. 8
- C. 6
- D. 10

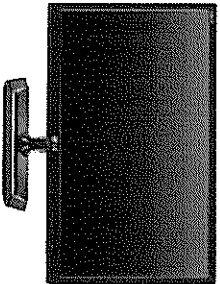
25. Find the value of x when these equations are solved simultaneously:

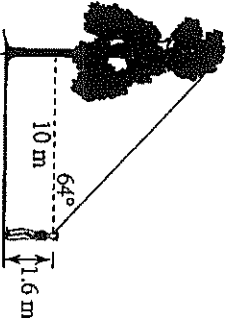
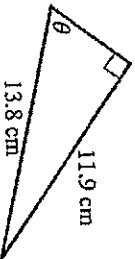
$$\begin{aligned} y &= 2x + 9 \\ x + 5y &= 1 \end{aligned}$$

- A. $x = 4$
- B. $x = 2$
- C. $x = \frac{-8}{11}$
- D. $x = -4$

	Linear Relationships (7 marks) Answer in the space provided:	Mark
1	Write the equation of a straight line with gradient 3 and y intercept -2.	[1]
2	<p>The interval AB on a number plane has endpoints A(-4,2) and B (6,4). Find:</p> <p>(a) the gradient of AB</p> <p>(b) the length of AB as a surd</p> <p>(c) the midpoint of AB</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p>
3	Find the equation of the line parallel to $y=2x+3$ and passing through (1,4)	[1]
4*	A triangle has vertices X(1,3), Y (0,0) and Z (7,1). Prove that this triangle is right angled.	[2]

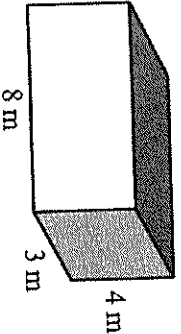
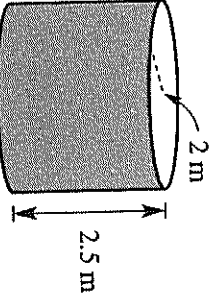
	Data Analysis (7 marks) Answer in the space provided:	Mark																
1	<p>The dot plot below represents the number of hours Joyce spent watching television over 26 weekends.</p> <div><div><p>Hours watching television</p></div><div><p>(a) What is the range of hours spent watching TV?</p><p>[1]</p></div><div><p>(b) What percentage of weekends did Joyce spend more than 6 hours watching TV? Answer to 2 decimal places.</p><p>[1]</p></div></div>																	
2	<p>The stem and leaf plot below shows the age of 25 offenders who were caught speeding.</p> <p>Find:</p> <div><div><table><tr><th>Stem</th><th>Leaf</th></tr><tr><td>1</td><td>8 8 9 9 9</td></tr><tr><td>2</td><td>0 0 0 1 1 3 4 6 9</td></tr><tr><td>3</td><td>0 1 2 7</td></tr><tr><td>4</td><td>2 5</td></tr><tr><td>5</td><td>3 6 8</td></tr><tr><td>6</td><td>6</td></tr><tr><td>7</td><td>4</td></tr></table><p>(a) the range</p><p>[1]</p></div><div><p>(b) the mode</p><p>[1]</p></div><div><p>(c) the median</p><p>[1]</p></div></div>	Stem	Leaf	1	8 8 9 9 9	2	0 0 0 1 1 3 4 6 9	3	0 1 2 7	4	2 5	5	3 6 8	6	6	7	4	
Stem	Leaf																	
1	8 8 9 9 9																	
2	0 0 0 1 1 3 4 6 9																	
3	0 1 2 7																	
4	2 5																	
5	3 6 8																	
6	6																	
7	4																	
3*	<p>Consider the points scored by a football team in a season.</p> <p>17,31,6,26,30,23,29,25,19,72,21,28,22,28,12.</p> <p>(a) Find the interquartile range.</p> <p>[1]</p> <p>(b) Explain why the interquartile range would be a better measure of spread than the range.</p> <p>[1]</p>																	

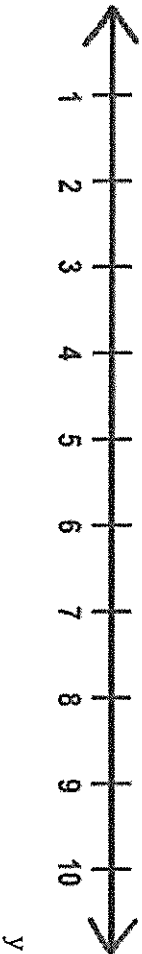
	Compound Interest (7 marks) Answer in the space provided:	Mark
1	<p>Calculate the simple interest when:</p> <p>(a) \$5000 is invested at 4%p.a for 6 years. [1]</p> <p>(b) \$2200 is invested at 8%p.a for 6 months [1]</p>	
2	<p>A computer depreciates by 30% each year. If it cost \$4000 when new, find its value after 3 years [1]</p>	
3	<p>A digital TV is purchased under the following terms:</p> <div style="text-align: center;">  </div> <p>Deposit: \$110 Repayments: \$41.85 each month for 2 years</p> <p>(a) Find the total amount paid for the television. [1]</p> <p>(b) The marked price was \$800. Calculate the additional charges as a percentage of the marked price. [1]</p>	
4*	<p>To had to decide between investing \$1000 at a simple interest rate of 11% p.a. for 4 years or investing the same amount at a compound interest rate for the same period of time. Which would be the better investment and by how much? [2]</p>	

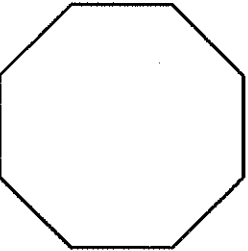
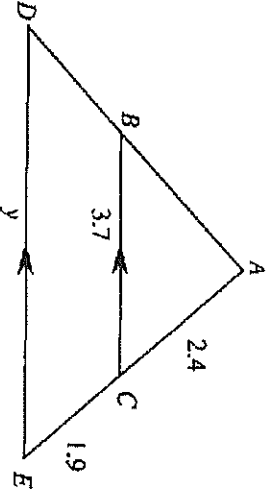
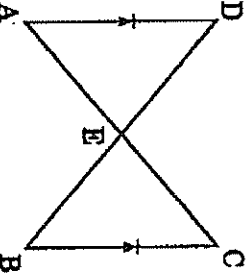
	Trigonometry (7 marks) Answer in the space provided:	Mark
1	<p>Calculate the following correct to 4 decimal places:</p> <p>(a) $4.9\cos 25^\circ =$ _____</p> <p>(b) $\frac{3.8}{\sin 14^\circ 12'} =$ _____</p>	<p>[1]</p> <p>[1]</p>
2	<p>Find the height of the tree, correct to one decimal place.</p> 	[2]
3	<p>Find the size of the unknown angle θ, correct to the nearest minute.</p> 	[1]
4*	<p>A hiker walks 3km east and then 1.6km south.</p> <p>(a) How far is the hiker from the starting point?</p> <p>(b) On what bearing would the hiker have to walk to return to the starting point? Give your answer to the nearest degree.</p>	<p>[1]</p> <p>[1]</p>

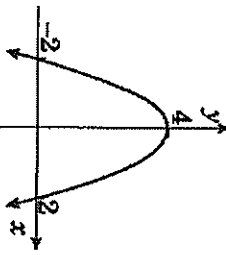
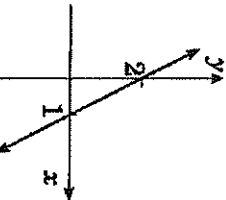
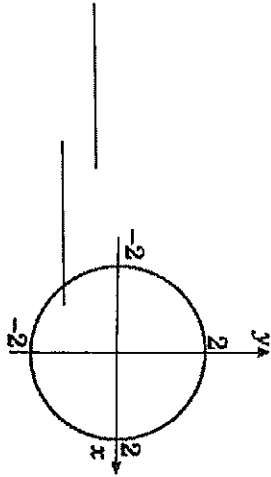
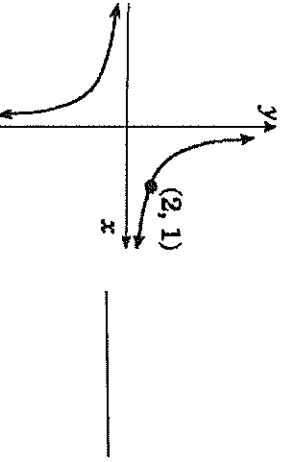
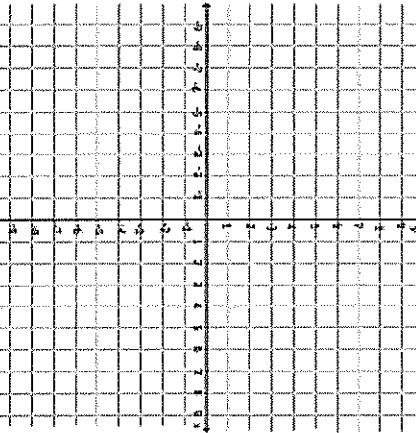
	Algebra (7 marks) Answer in the space provided:	Mark
1	<p>Expand and simplify:</p> $-4(2x + 7) =$	[1]
2	<p>Factorise each of these expressions:</p> <p>(a) $x(x + 3) - 2(x + 3) =$</p> <p>(b) $x^2 + 7x - 18 =$</p>	[1]
3	<p>Simplify this expression:</p> $\frac{3m - 6}{4} \times \frac{8m}{m(m - 2)}$	[1]
4*	<p>A rectangular garden bed is twice as long as it is wide. Its area is 84.5m^2. Find the length of the garden bed.</p>	[2]

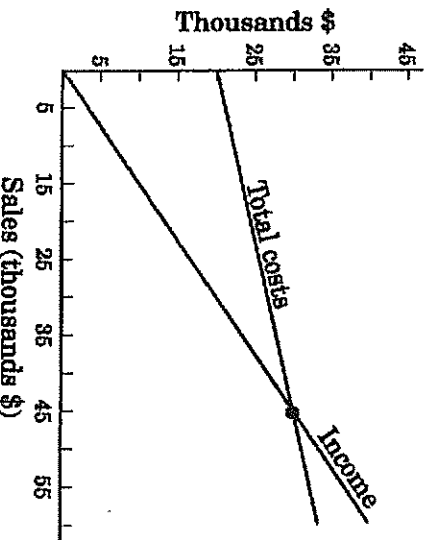
	Probability (7 marks) Answer in the space provided:	Mark
1	What is meant if the probability of an event occurring is found to be 1?	[1]
2	<p>A two digit number is formed using the digits 4, 6 and 9. The same number can be repeated.</p> <p>(a) Draw a tree diagram to represent all possible outcomes.</p>	[1]
3*	(b) How many elements are in the sample space?	[1]
	(c) What is the probability of forming a number where both digits are the same?	[1]
	(d) What is the probability of forming a number which is even?	[1]
	<p>A bag contains 9 blue marbles, 6 yellow marbles and 5 red marbles. Two marbles are drawn from the bag without replacement. Find the probability that:</p> <p>(a) Given one marble is red, the other is yellow.</p> <p>(b) Given one marble is blue, the other is also blue.</p>	[1]

	Surface Area and Volume (7 marks) Answer in the space provided:	Mark
1	How many cm^3 are there in 3.6m^3 ?	[1]
2	<p>Consider the rectangular prism below:</p>  <p>(a) Find the volume.</p> <p>(b) Find the surface area.</p>	[1]
3	<p>Consider the cylinder below:</p>  <p>(a) Find the volume, correct to the nearest m^3.</p> <p>(b) Find the capacity, correct to the nearest kilolitre.</p>	[1]
4*	A rectangular prism has a square base and a height of 15cm. If its volume is 735cm^3 , find the length of the base.	[2]

	Equations and Inequations (7 marks) Answer in the space provided:	Mark
1	<p>Solve $x^2 + 7x = 0$.</p>	[2]
2	<p>(a) Solve $\frac{y-4}{3} \geq -2$</p>	[2]
	<p>(b) Graph this solution on the number line.</p> 	[1]
3*	<p>Solve $3x^2 + 11x + 2 = 0$. Leave your answer in EXACT form.</p>	[2]

1	Geometry (7 marks) Answer in the space provided:	Mark
	 <p>This is a regular octagon. Find the size of each interior angle.</p>	[1]
2	 <p>(a) Prove that $\triangle ABC$ is similar to $\triangle ADE$.</p> <p>(b) Hence find a value for y correct to 1 decimal place. Give a reason for your answer</p>	[2]
3*	 <p>(a) Which congruence test proves $\triangle ADE \cong \triangle BCE$? _____</p> <p>(b) If $\angle ADE = 51^\circ$ and $\angle DAE = 49^\circ$, find the size of $\angle CBE$. _____</p>	[1] [1]

	Graphs (7 marks) Answer in the space provided	Mark
1	<p>From the list below match each equation to its correct graph. (Note: not every equation has a graph)</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>1. $y = 2^x$</p> <p>3. $y = (x + 2)^2$</p> <p>5. $y = -2x + 2$</p> <p>7. $y = 2x - 1$</p> <p>9. $y = (x - 2)^2$</p> </div> <div style="width: 45%;"> <p>2. $x^2 + y^2 = 4$</p> <p>4. $y = 4 - x^2$</p> <p>6. $y = x^3 + 2$</p> <p>8. $xy = 2$</p> <p>10. $y = -2 - x^3$</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;">   </div>	[5]
2*	<p>Draw a neat sketch $y = 2^{-x}$</p> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: center; margin-top: 20px;">Name the point where this graph cuts the y axis. _____</p>	[1]

Simultaneous Equations (5 marks) Answer in the space provided:	Mark
<p>1</p> <p>Solve these equations simultaneously:</p> $2x + y = 7$ $x = y - 4$	
<p>2</p> <p>Solve these equations simultaneously:</p> $5x + y = 10$ $3x + y = 8$	[2]
<p>3</p> <p>A company graphs its income versus total costs.</p>  <p>Once the business is underway, find the “break-even” point. That is, where total costs = income.</p> <p>Total costs = _____ Income = _____</p>	[1]

-END OF EXAM-