

Name _____ Teacher _____



Mathematics Year 9 May Common Test 2013

Time allowed – 70 minutes

Non Calculator – 10 minutes

Calculator – 60 minutes

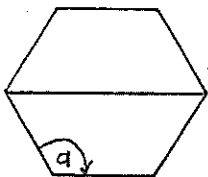
Instructions

- Approved calculators only may be used.
- All necessary working must be shown. Marks may not be awarded for careless or badly arranged work.
- Marks are shown next to each question.
- Total marks –

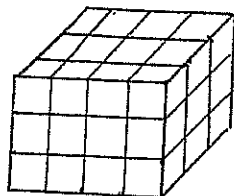
Non Calculator	Section 2 Total	Total
/10	/68	/78

Section 1

Non calculator (1 mark each – write the answers in the space provided)

	Answers
<p>1. How many significant figures in $302 \cdot 10$?</p> <p>A) 2 B) 5 C) 4 D) 3</p>	
<p>2. The distance of the earth from the sun is given as 152000000km. The number of significant figures here is:</p> <p>A) 9 B) 3 C) 6 D) Unable to be determined</p>	
<p>3. Two trapeziums fit together to make this regular hexagon</p>  <p>What is the value of a?</p>	
<p>4. On Monday Tim read 60% of a book. On Tuesday he read 20% of the remaining pages of the book. What percentage of the book remains to be read?</p>	
<p>5. After diving from 7.5m, Brynne Edelsten was travelling at 12m/s when she entered the water.</p> <p>What speed is this in km/h?</p>	

6. Mark made this rectangular prism using 36 cubes. He then painted the complete surface area grey. How many of the original cubes have no grey faces?

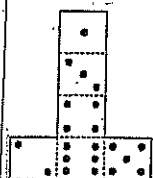


7. Here is a standard die.

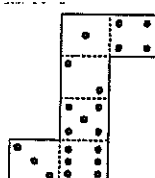
The sum of the dots on the opposite faces is 7.



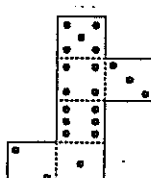
Which is the net of this die?



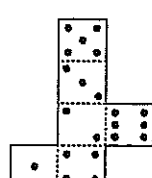
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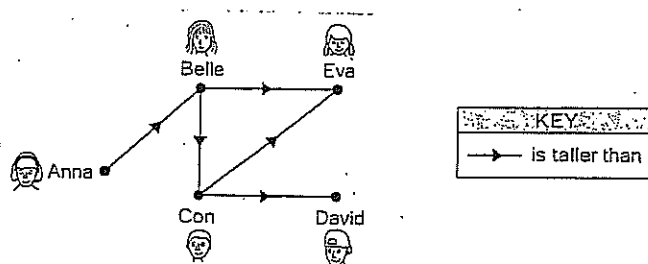
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8. Five students compared their heights.

This diagram shows their results.



Which student is the tallest?

Anna

☐

Belle

☐

Con

☐

David

☐

Eva

☐

<p>9. Which group of 3 numbers could not represent the sides of a triangle?</p> <p>A) (2,3,4) B) (4,4,2) C) (3,5,8) D) (7,11,15)</p>	
<p>10. Express 4.68×10^{-3} as a basic numeral.</p>	

Name: _____

Teacher: _____



SYDNEY TECHNICAL HIGH SCHOOL

MATHEMATICS

**YEAR 9 YEARLY
2012**

Time Allowed - 70 Minutes

Instructions:

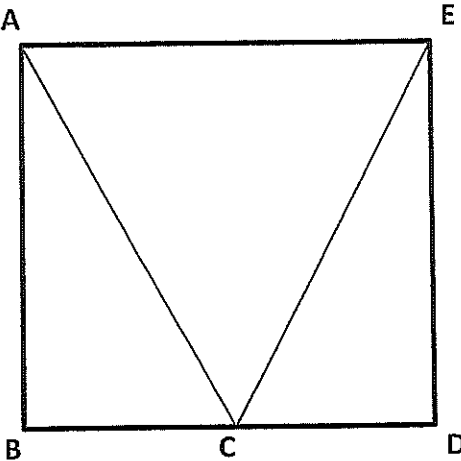
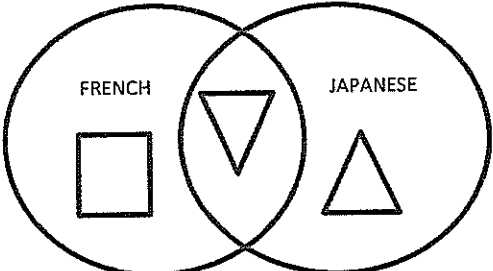
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- Marks are shown next to each question.
- Total Marks: 80

FACTORISING	MISCELLANEOUS	EQUATIONS, INEQUATIONS FORMULAE	CO-ORDINATE GEOMETRY	MEASUREMENT	TOTAL
/15	/20	/15	/15	/15	/80

FACTORISING

1.	<p>Fully factorise</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(a) $px - 2x + ap - 2a$ (2 marks)</p> <p>_____</p> <p>_____</p> <p>_____</p> </div> <div style="width: 45%;"> <p>(b) $49y^2 - 100z^2$ (2 marks)</p> <p>_____</p> <p>_____</p> <p>_____</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>(c) $x^2 - 6x + 8$ (1 mark)</p> <p>_____</p> <p>_____</p> </div> <div style="width: 45%;"> <p>(d) $6a^2 + 5a + 1$ (2 marks)</p> <p>_____</p> <p>_____</p> <p>_____</p> </div> </div> <div style="margin-top: 20px;"> <p>(e) $k^4 - 16$ (2 marks)</p> <p>_____</p> <p>_____</p> </div>	
2.	<p>Simplify</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>(a) $\frac{6x-4xy}{2x}$ (2 marks)</p> </div> <div style="width: 45%;"> <p>(b) $\frac{m^2-25}{m^2-5m} \div \frac{m+5}{5m}$ (2 marks)</p> </div> </div> <div style="margin-top: 40px;"> <p>(c) $\frac{3}{2x-1} + \frac{5}{4x+3}$ (2 marks)</p> </div>	

MISCELLANEOUS

1.	<p>Find the value of x and y if $(3 + \sqrt{2})(4 + 2\sqrt{2}) = x + \sqrt{y}$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(2 marks)</p>	2.	<p>Write $(x^2y^{-3})^{-1}$ with positive indices</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(2 marks)</p>												
3.	<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 2; padding-left: 20px;"> <p>In this diagram AEDB is a square: Prove $\triangle ABC \equiv \triangle CDE$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(3 marks)</p> </div> </div>														
4.	<p>Students studying at least one of the languages, French and Japanese, attend a meeting. Of the 28 students present, 18 study French and 22 study Japanese. Complete the Venn Diagram and two-way table, for this event.</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 30px;"></td> <td style="width: 100px;">Japanese</td> <td style="width: 100px;">Not Japanese</td> <td style="width: 30px;"></td> </tr> <tr> <td style="text-align: left;">French</td> <td style="width: 100px; height: 30px;"></td> <td style="width: 100px; height: 30px;"></td> <td style="width: 30px;"></td> </tr> <tr> <td style="text-align: left;">Not French</td> <td style="width: 100px; height: 30px;"></td> <td style="width: 100px; height: 30px;"></td> <td style="width: 30px;"></td> </tr> </table> </div> <p style="margin-top: 20px;">What is the probability that a randomly chosen student</p> <p>(a) studies French _____</p> <p>(b) studies Japanese _____</p> <p>(c) studies both French and Japanese _____ (5 marks)</p>				Japanese	Not Japanese		French				Not French			
	Japanese	Not Japanese													
French															
Not French															

5.

This stem and leaf plot shows the number of cars sold each month by Dodgy Bros Used Cars.

Stem	Leaf
2	8 9
3	0 2 5 6 8 8
4	4 7 8
5	1 3

(a) What is the median number of cars sold? _____

(b) What is the range of cars sold?

(c) What is the mode?

(3 marks)

6.

The data shows the ages of a group of people who participated in a survey.

22 30 36 35 40 41 36 35 30 25
32 34 36 38 37 28 31 44 29 33

(a) Complete this frequency table.

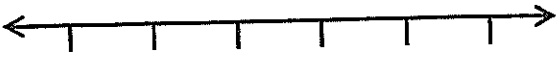
Class	Class Centre (cc)	Tally	Frequency (f)	f x cc
20-24	22		1	22
25-29	27		3	81
30-34			6	
35-39				
40-44	42		3	126
			$\Sigma f =$	$\Sigma(f \times cc) =$

(b) Calculate the mean. _____

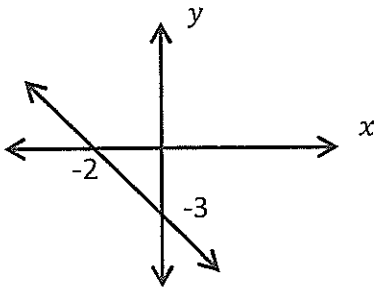
(c) What is the modal class. _____

(5 marks)

EQUATIONS, INEQUALITIES AND FORMULAE

1.	<p>Solve the following equations:</p> <p>(a) $3x - 1 = 4 - 2x$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(1 mark)</p>	<p>(b) $5(2x - 4) = 8(3x - 6)$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(2 marks)</p>
	<p>(c) $\frac{x + 1}{3} = \frac{4x - 2}{5}$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(2 marks)</p>	
2.	<p>Solve and then graph $-2x < -x + 27$ on a number line.</p> <p>_____</p> <p>_____</p> <p>_____</p> <div style="text-align: center;">  </div> <p>(3 marks)</p>	
3.	<p>Use the formula $E = \frac{1}{2}mv^2$ to find E when $m = 12.8$ and $v = 4.5$.</p> <p>_____</p> <p>_____</p> <p>(1 mark)</p>	<p>4. If $T = \frac{m_1 - m_2}{1 + m_1 m_2}$, find the value of m_2 when $T = \frac{-1}{5}$ and $m_1 = 3$.</p> <p>_____</p> <p>_____</p> <p>(2 marks)</p>
5.	<p>If $m = 2n + 9$, find the values of m and n given that m is 4 more than n.</p> <p>_____</p> <p>_____</p> <p>(2 marks)</p>	<p>6. Make G the subject of the formula $E = 1 - \sqrt{\frac{G}{R}}$</p> <p>_____</p> <p>_____</p> <p>(2 marks)</p>

CO-ORDINATE GEOMETRY

1.	<p>What is the equation of line l</p>  <p style="text-align: right;">(2 marks)</p>	
2.	<p>Given the points A(-1,3) and B (-2,5)</p> <p>(a) Find the midpoint of the interval AB</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(1 mark)</p>	<p>(b) Find the length of the interval AB leaving your answer in surd form</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(1 marks)</p>
	<p>(c) Find the gradient of the interval AB</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: right;">(1 marks)</p>	
3.	<p>Given $(2,k)$ lies on the line $x + 2y = 8$, find the value of k</p> <p style="text-align: right;">(1 mark)</p>	
4.	<p>Find the co-ordinates of the point where the line $2x + y = 6$ cuts the x axis.</p> <p style="text-align: right;">(2 marks)</p>	

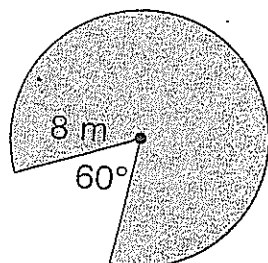
5.	<p>Find the equation of the line through (2,-3) parallel to $y = 4 - 7x$. Leave your answer in general form.</p> <p style="text-align: right;">(2 marks)</p>
6.	<p>The equation of the line BD is $3x - y - 13 = 0$. Find the gradient of a line perpendicular to BD</p> <p style="text-align: right;">(2 marks)</p>
7.	<p>Graph $2x + y < 1$ on the number plane below</p> <div data-bbox="379 1039 1193 1715" data-label="Figure"> </div> <p style="text-align: right;">(3 marks)</p>

MEASUREMENT

1.

For the following figure, find correct to 2 decimal places

(a) Its perimeter



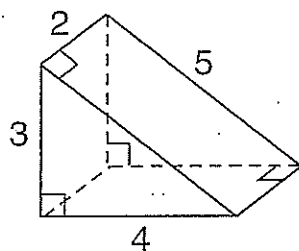
(b) its area

(4 marks)

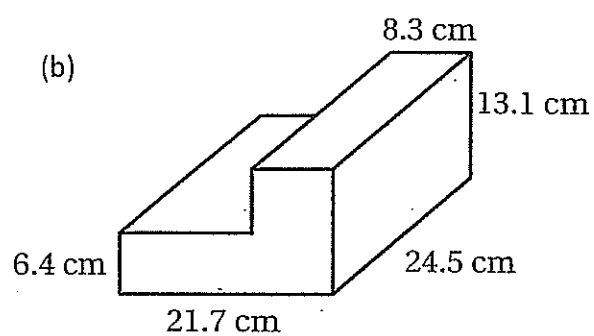
2.

Find the volume of each prism

(a)



(b)

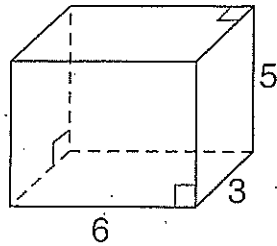


(2 marks)

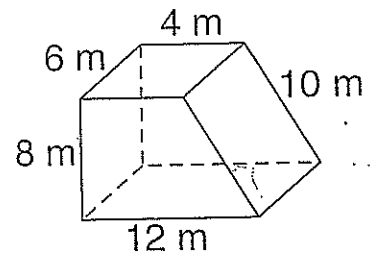
3.

Find the surface area of each prism

(a)



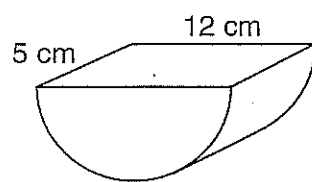
(b)



(4 marks)

4.

Find the surface area of this half-cylinder, correct to 1 decimal place.



(2 marks)

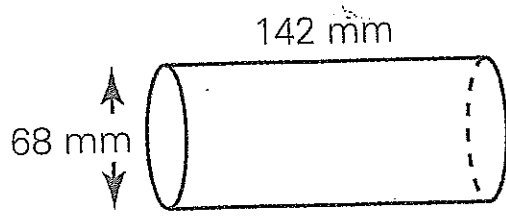
5.

Find the side length of a cube whose surface area is 1176cm^2 .

(1 marks)

6.

Find the volume of the cylinder.



(2 marks)

Name _____ Teacher _____



Mathematics Year 9 May Common Test 2013

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Non Calculator – 10 minutes

Calculator – 60 minutes

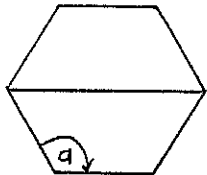
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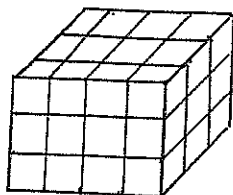
Non Calculator	Section 2 Total	Total
/10	/68	/78

Section 1

Non calculator (1 mark each – write the answers in the space provided)

	Answers
<p>1. How many significant figures in $302 \cdot 10$?</p> <p>A) 2 B) 5 C) 4 D) 3</p>	B
<p>2. The distance of the earth from the sun is given as 152000000km. The number of significant figures here is:</p> <p>A) 9 B) 3 C) 6 D) Unable to be determined</p>	D
<p>3. Two trapeziums fit together to make this regular hexagon</p>  <p>What is the value of a?</p>	120°
<p>4. On Monday Tim read 60% of a book. On Tuesday he read 20% of the remaining pages of the book. What percentage of the book remains to be read?</p> $\frac{80}{100} \times \frac{40}{100} = \frac{32}{100}$	32%
<p>5. After diving from 7.5m, Brynne Edelsten was travelling at 12m/s when she entered the water.</p> <p>What speed is this in km/h?</p> 12×3.6	$\begin{array}{r} 12 \\ \times 3.6 \\ \hline 72 \\ 360 \\ \hline 43.2 \end{array}$ <p>43.2km/h</p>

6. Mark made this rectangular prism using 36 cubes. He then painted the complete surface area grey. How many of the original cubes have no grey faces?



2

7. Here is a standard die.

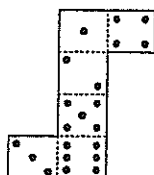
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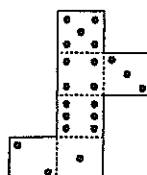
Which is the net of this die?



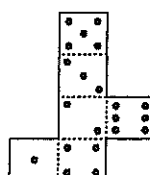
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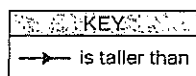
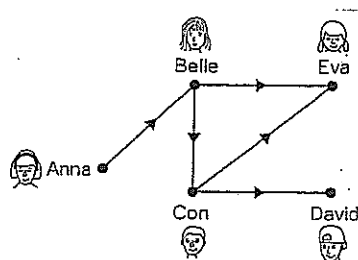
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8. Five students compared their heights.

This diagram shows their results.



Which student is the tallest?

Anna

☒

Belle

☐

Con

☐

David

☐

Eva

☐

<p>9. Which group of 3 numbers could not represent the sides of a triangle?</p> <p>A) (2,3,4) B) (4,4,2) C) (3,5,8) D) (7,11,15)</p>	<p>C</p>
<p>10. Express 4.68×10^{-3} as a basic numeral.</p>	<p>0.00468</p>

Name _____ Teacher _____

Section 2

Algebra	Geometry	Surds and Indices	Probability	Measurement
/11	/15	/17	/17	/6

Calculators are permitted. Questions are worth one mark each unless marked otherwise.

Show all working.

<p>A - Algebra (11 Marks)</p> <p>1. Expand and simplify</p> <p>a) $4a - 3(2a + 5)$</p> $\begin{array}{r} 4a - 6a - 15 \\ -2a - 15 \end{array}$ <p>b) $(3m - 4)(m + 2)$ (2marks)</p> $\begin{array}{r} 3m^2 + 6m - 4m - 8 \\ 3m^2 + 2m - 8 \end{array}$ <p>c) $(3x + 2)^2 - 6(x + 1)$ (2 marks)</p> $\begin{array}{r} 9x^2 + 12x + 4 - 6x - 6 \\ 9x^2 + 6x - 2 \end{array}$	
<p>2. Simplify</p> <p>a) $\frac{8x}{5} - \frac{x}{4}$</p> $\frac{32x}{20} - \frac{5x}{20} = \frac{27x}{20}$ <p>b) $\frac{3}{x} + \frac{4}{y}$ (2 marks)</p> $\frac{3y + 4x}{xy}$ <p>c) $\frac{10x}{3} \div \frac{2x^2}{9}$ (2 marks)</p> $\frac{10x}{3} \times \frac{9}{2x^2} = \frac{15}{x}$	

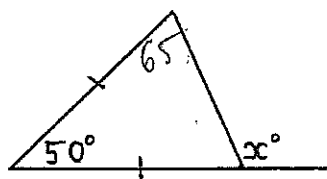
3. Mrs Wang is Y years old and her son is 26 years younger. How old will the son be in X years time?

$$Y - 26 + X$$

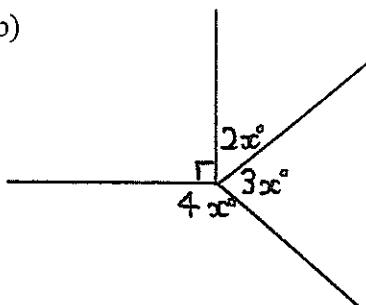
B – Geometry (15 marks)

1. Find the value of each pronumeral (reasons not required)

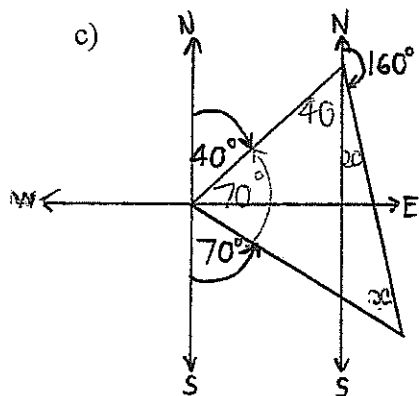
a)



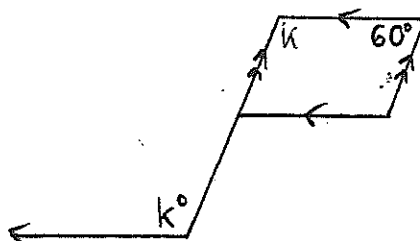
b)



c)



d)



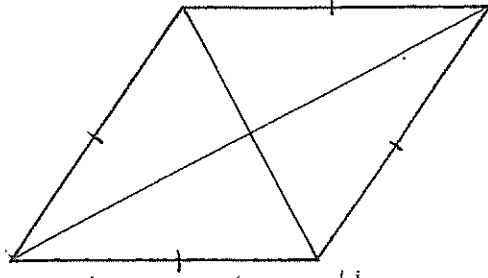
a) 115°

b) 30°

c) 50°

d) 120°

2. List any 3 properties about the diagonals of a rhombus



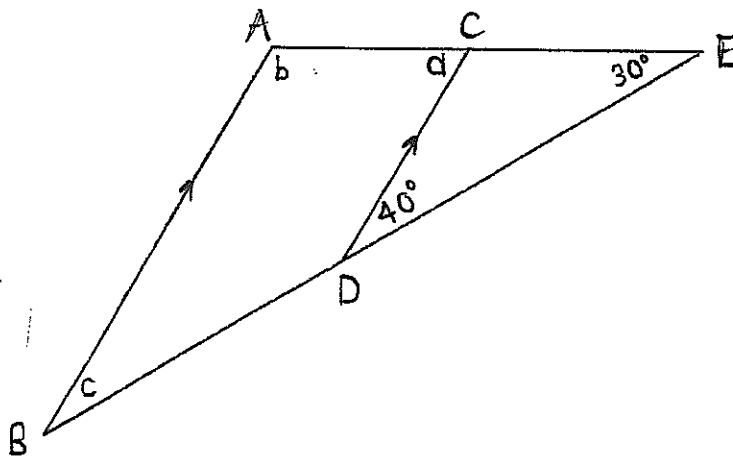
- (i) Bisect each other
- (ii) Meet at 90°
- (iii) Bisect the angles at vertices

3. What is the size of the exterior angles in a regular dodecagon (50c piece)?

$$360^\circ \div 12$$

$$30^\circ$$

4. Find the value of each pronumeral and give the appropriate reason.



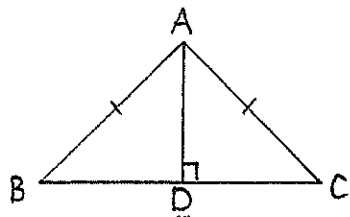
(i) $a = 70^\circ$ (Exterior angle of Δ)

$b = 110^\circ$ (Co-interior angles $AB \parallel CD$)

$c = 40^\circ$ (Angle sum of Δ)

5. By using a congruent triangle proof, prove that the base angles of an isosceles triangle are equal, giving a reason for your conclusion.

(4 marks)



In Δ 's ABD and ACD,

AD is common

AB = AC given

$\angle ADC = \angle ADB$ ($AD \perp BC$)

$\therefore \Delta ABD \equiv \Delta ACD$ (RHS)

$\angle ABD = \angle ACD$ (corresponding angles in congruent triangles)

C – Surds and Indices (17 marks)

1. Simplify

$$\begin{array}{r} \text{a) } \sqrt{108} \\ \hline \sqrt{36 \times 3} \\ \hline 6\sqrt{3} \end{array}$$

$$\begin{array}{r} \text{b) } 6\sqrt{8} \\ \hline 6 \times 2\sqrt{2} \\ \hline 12\sqrt{2} \end{array}$$

$$\text{c) } \sqrt{45} - \sqrt{20} \text{ (2 marks)}$$

$$\begin{array}{r} 3\sqrt{5} - 2\sqrt{5} \\ \hline \sqrt{5} \end{array}$$

$$\text{d) } 15\sqrt{72} \div 5\sqrt{6} \text{ (2 marks)}$$

$$\begin{array}{r} 3\sqrt{72 \div 6} \\ \hline 3\sqrt{12} = 3 \times 2\sqrt{3} \\ \hline = 6\sqrt{3} \end{array}$$

2. Expand and simplify

a) $2\sqrt{3}(6 - \sqrt{3})$

$$\frac{12\sqrt{3} - 6}{}$$

b) $(4\sqrt{5} - 5)(4\sqrt{5} + 5)$ (2 marks)

$$\frac{16 \times 5 - 25}{55}$$

3. Rationalise the denominator and simplify your answer fully.

(2 marks)

$$\frac{8 + \sqrt{6}}{2\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{8\sqrt{6} + 6}{12} = \frac{4\sqrt{6} + 3}{6}$$

4. By rationalising the denominator or otherwise, evaluate

$$7 \div \sqrt{7}$$

$$\sqrt{7}$$

5. Simplify using Index Laws

a)

$$\frac{(x^2)^3}{x^5} = \frac{x^6}{x^5}$$

$$= x$$

b) $5ab \times 2a^3$

$$10a^4b$$

c) $4x^\circ - (4x)^\circ$

$$4 - 1$$

$$3$$

d) $\sqrt{\frac{y^{4+n}}{y^{4-n}}}$ (2 marks)

$$\left(y^{4+n-4+n}\right)^{\frac{1}{2}}$$

$$\left(y^{2n}\right)^{\frac{1}{2}}$$

$$y^n$$

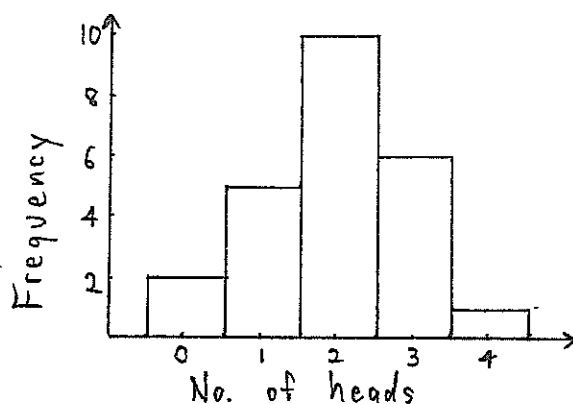
D - Probability (17 marks)

1. If the probability of an event occurring is 0.38, how many times would you expect it to occur in 500 trials?

$$0.38 \times 500$$

190

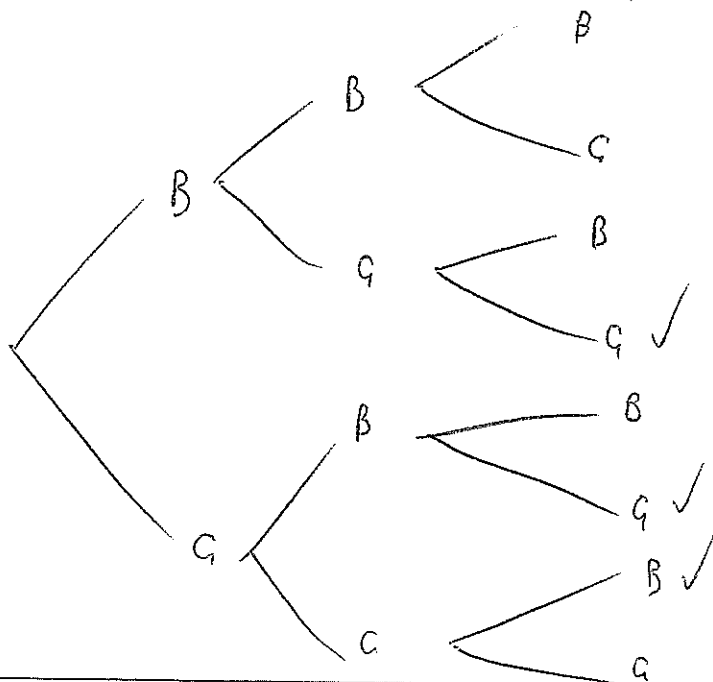
2. David tossed 4 coins 24 times and the number of heads was recorded each time. The histogram shows the results.



(i) What is the P (0 heads)? $\frac{2}{24} = \frac{1}{12}$

(ii) What is the P (at least 3 heads)? $= \frac{7}{24}$

3. In a family of 3 children, draw a tree diagram to find the probability of having 2 girls and a boy in any order. (2 marks)



$\frac{3}{8}$

4. Two dice are rolled.

(i) Draw a table to represent all outcomes.

(ii) Find the P (total is less than 6).

#2 \ #1	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

(ii) $\frac{10}{36}$
or
 $\frac{5}{18}$

5. From a standard pack of 52 cards, one card is drawn at random. Find the probability that the card is;

a) an Ace

b) a black card or a King

c) not a Jack or Queen

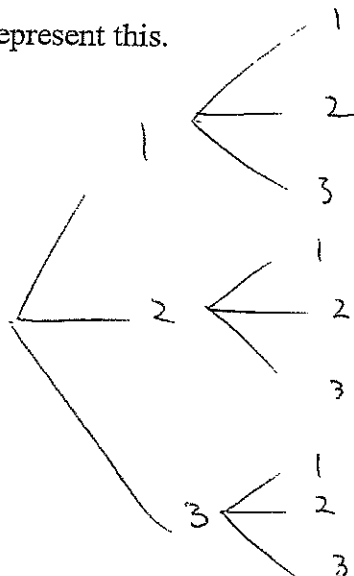
a) $\frac{1}{13}$

b) $\frac{28}{52}$ or $\frac{7}{13}$

c) $\frac{11}{13}$ or $\frac{44}{52}$

6. Three cards labelled 1, 2 and 3 are placed in a hat. A card is chosen and then replaced before a second card is chosen. Draw a tree diagram to represent this.

(a)



Find the probability of:

- b) the cards having the same number
- c) the sum of the two numbers being 4
- d) the cards being different

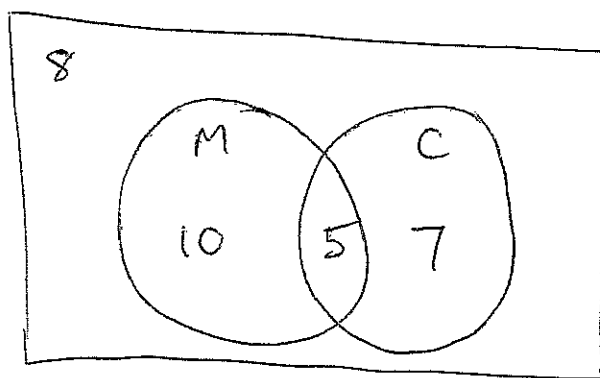
b) $\frac{3}{9}$ or $\frac{1}{3}$

c) $\frac{3}{9}$ or $\frac{1}{3}$

d) $\frac{6}{9}$ or $\frac{2}{3}$

7. Of the 30 students in 9M, 15 love Maths, 12 love Science and 8 love neither.

- a) Draw a Venn Diagram representing this information



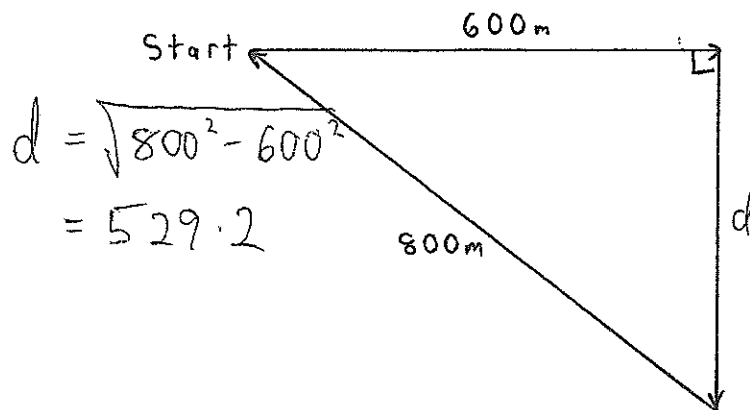
- b) How many love both Maths and Science?
- c) How many love Maths but not Science?

b) 5

c) 10

E – Measurement (6 marks)

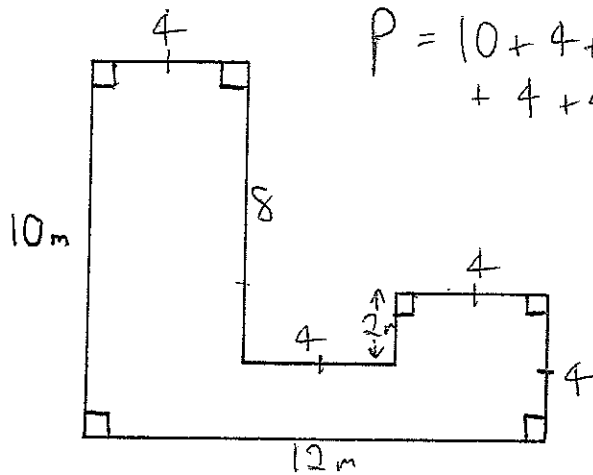
1. Find the distance correct to one decimal place of the sailing course below (2 marks):



$P =$
 1929.2 m

2. Find the perimeter of each shape (correct to one decimal place where necessary). (2 marks each)

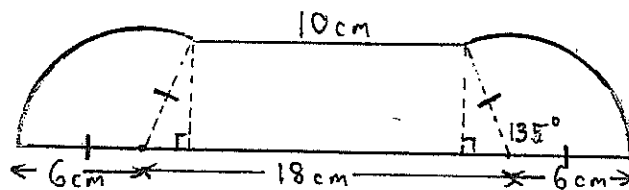
a)



$P = 10 + 4 + 8 + 4 + 2$
 $+ 4 + 4 + 12$

a) 48 m

b)



$P = 6 + 18 + 6 + 10 + 2 \left(\frac{135}{360} \times 2 \times \pi \times 6 \right)$

b) 68.3 m

