

Name: ..... Maths Class: .....

## SYDNEY TECHNICAL HIGH SCHOOL



Year 8

Mathematics

Common Test 1

Week 2 Term 2 2015

*Time Allowed: 70 Minutes*

Instructions:

- Write your answers in the space provided.
- Write in BLUE or BLACK pen only.
- Poorly arranged answers may not be awarded full marks.
- Write your name and class at the top of this page.
- All questions need to be attempted.

Topics

Question 5

<b>Pythagoras</b> Question 1	/12	/2
<b>Percentages</b> Question 2	/12	/3
<b>Algebra</b> Question 3	/12	/4
<b>Geometry</b> Question 4	/12	/3
<b>TOTAL</b>		/60

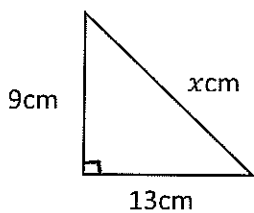
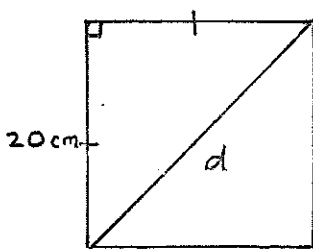
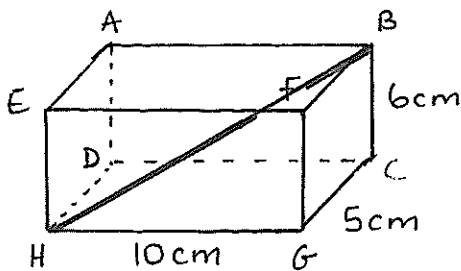


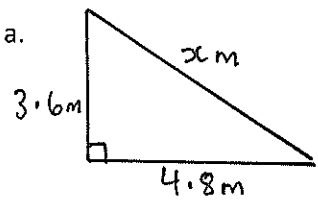
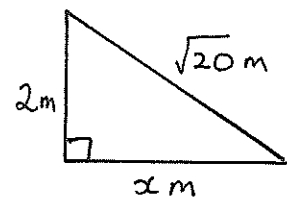
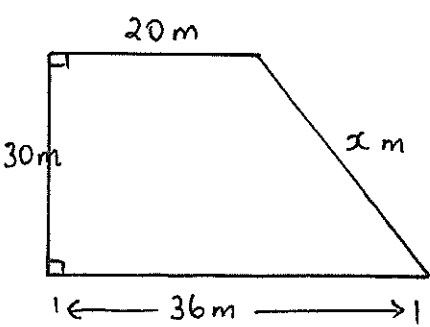
## Question 1

## Pythagoras' theorem

(12 marks)

Answer

1.	Which of the following statements is always true? A. All acute angled triangles contain a hypotenuse B. All isosceles triangles contain a hypotenuse C. All right angle triangles are scalene D. All right angle triangles have a hypotenuse E. All of the above.	
2.	A right angle triangle has three sides all having integer values. If two of the sides measure 9cm and 15cm, then the third side of the triangle must be? A. 306cm B. 12cm C. 17cm D. 144cm E. 24cm	
3.	 <p>The value of <math>x</math> is closest to: A. 22cm B. 9cm C. 250cm D. 16cm E. 15cm</p>	
4.	 <p>The length of the diagonal <math>d</math> is: A. 20cm B. 40cm C. 28cm D. <math>\sqrt{800}</math> cm E. <math>\sqrt{400}</math> cm</p>	
5.	<p>An expression for the length of the diagonal BH for this rectangular prism is:</p>  <p>A. <math>\sqrt{10 + 5 + 6}</math> B. <math>\sqrt{15^2 + 6^2}</math> C. <math>\sqrt{10^2 + 5^2 + 6^2}</math> D. <math>10 + 5 + 6</math> E. None of the above</p>	

6.	<p>Find the value of <math>x</math> in the following</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>a.</p>  </div> <div style="text-align: center;"> <p>b.</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="width: 45%;"> <hr/><hr/><hr/> </div> <div style="width: 45%;"> <hr/><hr/><hr/> </div> </div>	(4 marks)
7.	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(i) Find the value of <math>x</math></p>  </div> <div style="width: 50%;"> <p>(ii) find the perimeter of the trapezium below</p> <p>(i) _____</p> <p>_____</p> <p>_____</p> <p>(ii) _____</p> <p>_____</p> <p>_____</p> </div> </div>	(2+1 marks)

## Question 2

## Percentages

(12 marks)

Answer

1.	Which of the following is the percentage equivalent of $\frac{2}{7}$ , to the nearest percent?  A 27%                      B 29%                      C 26% D 30%                      E 28%	1.
2.	The percentage equivalent of 1.58 is:  A 0.158%                      B 1.58%                      C 15.8% D 158%                      E 1580%	2.
3.	The correct working line to express 27 as a percentage of 93 is:  A $\frac{93}{100} \times 27\%$ B $\frac{27}{100} \times 93\%$ C $\frac{93}{27} \times 100\%$ D $\frac{100}{27} \times 93\%$ E $\frac{27}{93} \times 100\%$	3.
4.	The new price when an item marked at \$45 is marked up by 14%  A \$51.40                      B \$53.70                      C \$51.30 D \$53.60                      E \$52.50	4.
5.	If 30% of an amount of money is \$22.50, how much is 20% of that amount?  A \$12.50                      B \$15.00                      C \$17.50 D \$13.75                      E \$16.25	5.
6.	Find $12\frac{1}{2}\%$ of \$980	6.
7.	Decrease \$88.50 by 8%	7.
8.	A car was bought for \$92500 and sold one year later for \$78000.  Calculate the loss as a percentage of the original price. Express your answer correct to 1 decimal place.	8.

		ANSWERS
9.	Write 15.5% as a simple fraction	9.
10.	Express 345 grams as a percentage of 4kg.	10.
11.	Daniel earns \$400 a week. He pays 15% of this in tax. How much tax does he pay in a year? ( 1 year = 52 weeks ).	11.
12.	Toni invests \$8000 in an account earning 6% p.a simple interest. How much interest does Toni earn on this investment in 5 years?	12.

### Question 3

### Algebra

(12 marks)

### Answer

1.	One tenth of the sum of $x$ and 9 can be written as:  <b>A</b> $\frac{1}{10} + x + 9$ <b>B</b> $\frac{x}{10} + 9$ <b>C</b> $\frac{x}{10} + \frac{9}{10}$  <b>D</b> $\frac{1}{10} \times x + 9$ <b>E</b> $\frac{x}{10} \times 9$	1.
2.	The value of $x^3 - x^2 - 4y$ if $x = -3$ and $y = 4$ is:  <b>A</b> -52 <b>B</b> 2 <b>C</b> -43  <b>D</b> -34 <b>E</b> 20	2.
3.	Which of the following expressions is the same as: $(3a^2b)^3$ ?  <b>A</b> $9a^6b^3$ <b>B</b> $9a^5b^3$ <b>C</b> $27a^5b^4$  <b>D</b> $27a^5b^3$ <b>E</b> $27a^6b^3$	3.
4.	The statement $7a + 9b - 2ab + 8ba + 2a - 2b$ when simplified by combining the like term is:  <b>A</b> $9a - 7b + 6ab$ <b>B</b> $9a + 7b - 2ab + 8ba$  <b>C</b> $9a + 7b + 6ab$ <b>D</b> $9a - 9b - 6ab$ <b>E</b> $9a + 9b - 6ab$	4.

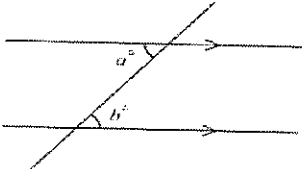
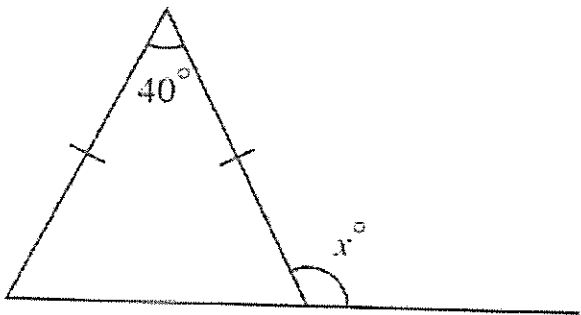
5.	<p>The expression <math>\frac{12x^3+4x}{2x}</math> when simplified is:</p> <p>A <math>6x^2 + 2</math>                      B <math>6x^2 + 4x</math>      C <math>12x^2 + 4x</math></p> <p>D <math>6x^3 + 2</math>                      E 8</p>	5.
6.	<p>Expand and simplify</p> <p><math>7(b + 2a) - 6a</math></p>	6.
7.	<p>Simplify <math>7a^4b^6 \times 2a^8b^2</math></p>	7.
8.	<p>Simplify <math>7x + 4y - 10x + y^2</math></p>	8.
9.	<p>Simplify <math>5^9 \div 5^7</math></p>	9.
10.	<p>If <math>x</math> is an even number then an expression for the next even number is?</p>	10.
11.	<p>Fully factorise <math>16ab - 24a^2</math></p>	11.
12.	<p>Simplify <math>7 + 8a^0</math></p>	12.

## Question 4

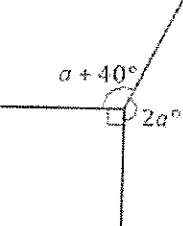
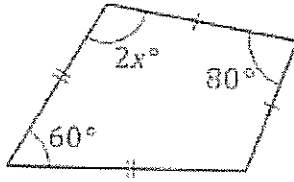
## Geometry

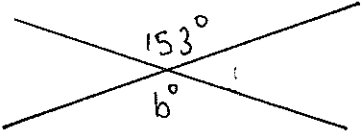
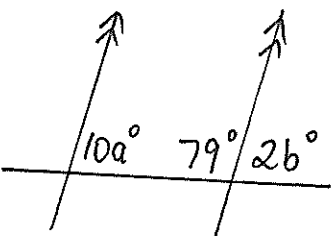
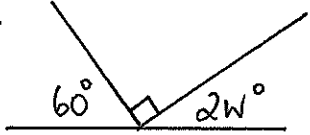
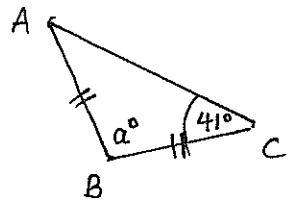
(12 marks)

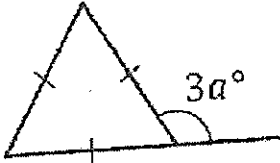
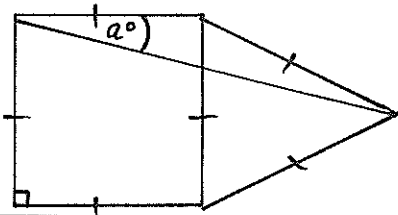
## Answer

1.	<p>In the following diagram, <math>a</math> and <math>b</math> are:</p>  <p> <b>A</b> vertically opposite      <b>B</b> corresponding  <b>C</b> co-interior      <b>D</b> alternate  <b>E</b> complementary         </p>	1.
2.	<p>A rhombus has:</p> <p> <b>A</b> All sides of equal length and one pair of equal angles  <b>B</b> Two pairs of equal length sides and one pair of equal angles  <b>C</b> All sides of equal length and two pairs of equal angles  <b>D</b> Two pairs of equal length sides and two pairs of equal angles  <b>E</b> None of the above         </p>	2.
3.	<p>The value of <math>x</math> in the following diagram is:</p>  <p> <b>A</b> 90      <b>B</b> 110      <b>C</b> 50  <b>D</b> 65      <b>E</b> 120         </p>	3.



4.	<p>Which of the following is true for the diagram below?</p>  <p>A <math>3a + 40 = 360</math>      B <math>2a = a + 40</math>      C <math>3a + 40 = 270</math> D <math>a = 60</math>      E <math>2a - (a + 40) = 0</math></p>	4.
5.	<p>For the kite shown below, the value of <math>x</math> is:</p>  <p>A 60      B 80      C 110 D 55      E 40</p>	5.

6.	<p>Write down the reason for each of the following</p> <p>a.  <math>b = 153</math></p> <p>b.  <math>10a = 2b</math></p> <p>c.  <math>60 + 90 + 2w = 180</math></p>	<p>Reason</p> <hr/> <hr/> <hr/> <p>Reason</p> <hr/> <hr/> <hr/> <p>Reason</p> <hr/> <hr/> <hr/>
7.	<p>Find the value of <math>a</math> in this diagram giving reasons.</p> 	<p><b>ANSWER HERE</b></p>

8.	Find the value of $a$ in each of these diagrams. (Reasons not required).	
a.		<hr/> <hr/> <hr/>
b.		<hr/> <hr/> <hr/>

## Question 5

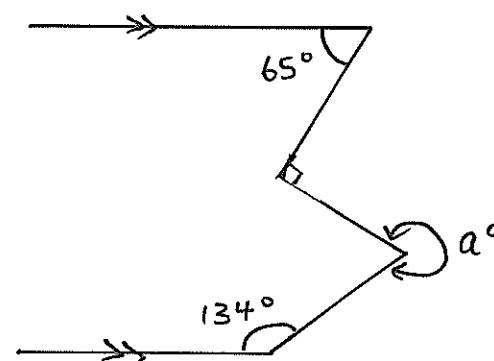
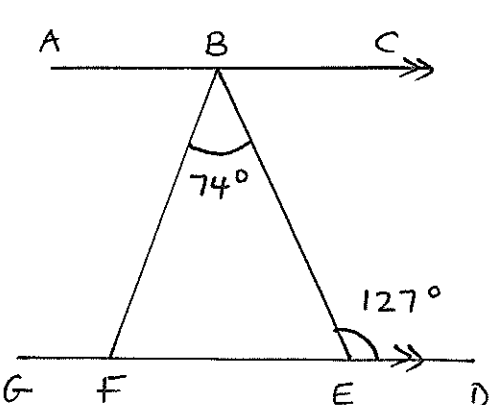
Mixed

(12 marks)

ANSWER IN THE SPACE PROVIDED

		Mark
1.	<p>The diagonal of a rectangle is 45mm. The rectangles length is twice the breadth.</p> <p>Calculate the <i>exact</i> breadth of the rectangle.</p> <p><b>ANSWER AND WORKING HERE</b></p>	2 marks
2.	<p>A measurement of 72cm is increased by 20% and then the result is decreased by 20%</p> <p>What is the overall percentage change?</p> <hr/> <hr/> <hr/>	1 mark
3.	<p>James sells second hand cars. His commission is based on a sliding scale of 6% on the first \$2000 of his sales, 3.5% on the next \$1000, and 2% thereafter.</p> <p>What is James' commission on a car selling for \$5670?</p> <hr/> <hr/> <hr/>	2 marks

4.	<p>Fully simplify</p> <p>a) <math>7(2x + 3y - 2) - (x + 3y + 1)</math></p> <hr/> <hr/> <p>b) <math>\frac{(6w^4)^2 \times \frac{1}{3}w^2}{4w^3 + 2w^3}</math></p> <hr/> <hr/>	4 marks
----	--	---------

5.	 <p>(Not to scale)</p> <p>Find the value of <math>a</math> in this diagram</p> <p>ANSWER _____</p>	1 mark
6.	 <p>(Not to scale)</p> <p>Find giving reasons the size of <math>\angle ABF</math></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	2 marks

Name: ANSWERS Maths Class: .....

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Year 8

Mathematics

Common Test 1

Week 2 Term 2 2015

*Time Allowed: 70 Minutes*

### Instructions:

- Write your answers in the space provided.
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- Write your name and class at the top of this page.
- All questions need to be attempted.

### Topics

### Question 5

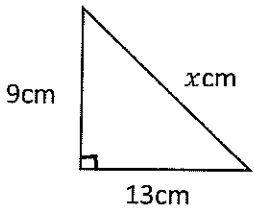
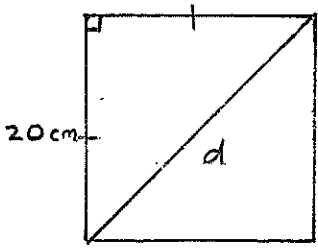
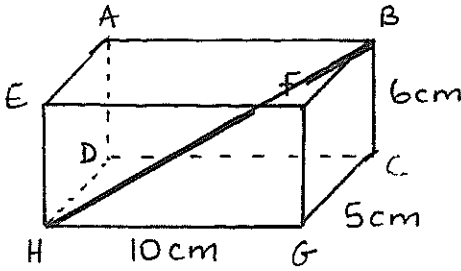
<b>Pythagoras</b> Question 1	/12	/2
<b>Percentages</b> Question 2	/12	/3
<b>Algebra</b> Question 3	/12	/4
<b>Geometry</b> Question 4	/12	/3
<b>TOTAL</b>		/60

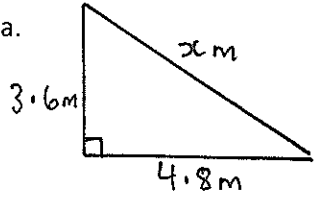
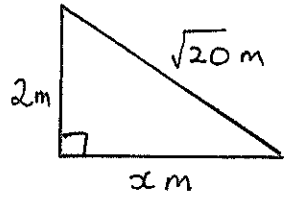
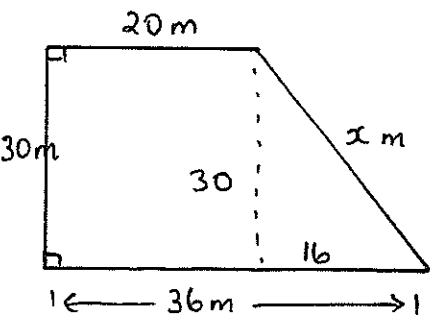
## Question 1

## Pythagoras' theorem

(12 marks)

Answer

1.	Which of the following statements is always true? A. All acute angled triangles contain a hypotenuse B. All isosceles triangles contain a hypotenuse C. All right angle triangles are scalene D. All right angle triangles have a hypotenuse E. All of the above.	D
2.	A right angle triangle has three sides all having integer values. If two of the sides measure 9cm and 15cm, then the third side of the triangle must be? A. 306cm B. 12cm C. 17cm D. 144cm E. 24cm	B
3.	 <p>The value of <math>x</math> is closest to: A. 22cm B. 9cm C. 250cm D. 16cm E. 15cm</p>	D
4.	 <p>The length of the diagonal <math>d</math> is: A. 20cm B. 40cm C. 28cm D. <math>\sqrt{800}</math> cm E. <math>\sqrt{400}</math> cm</p>	D
5.	<p>An expression for the length of the diagonal BH for this rectangular prism is:</p>  <p>A. <math>\sqrt{10 + 5 + 6}</math> B. <math>\sqrt{15^2 + 6^2}</math> C. <math>\sqrt{10^2 + 5^2 + 6^2}</math> D. <math>10 + 5 + 6</math> E. None of the above</p>	C

6.	<p>Find the value of <math>x</math> in the following</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>a.</p>  <math display="block">\begin{aligned} x^2 &amp;= 3.6^2 + 4.8^2 \\ &amp;= 36 \\ x &amp;= 6 \end{aligned}</math> </div> <div style="text-align: center;"> <p>b.</p>  <math display="block">\begin{aligned} x^2 + 2^2 &amp;= \sqrt{20}^2 \\ x^2 &amp;= 16 \\ x &amp;= 4 \end{aligned}</math> </div> </div>	(4 marks)
7.	<div style="display: flex; justify-content: space-between;"> <p>(i) Find the value of <math>x</math></p> <p>(ii) find the perimeter of the trapezium below</p> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div> <p>(i) <math display="block">\begin{aligned} x^2 &amp;= 16^2 + 30^2 \\ x^2 &amp;= 1156 \\ x &amp;= 34 \end{aligned}</math></p> <p>(ii) <math display="block">\begin{aligned} P &amp;= 30 + 20 + 34 + 36 \\ &amp;= 120 \text{ m} \end{aligned}</math></p> </div> </div>	(2+1 marks)



## Question 2

## Percentages

(12 marks)

Answer

1.	Which of the following is the percentage equivalent of $\frac{2}{7}$ , to the nearest percent?  A 27%                      B 29%                      C 26% D 30%                      E 28%	1.  B
2.	The percentage equivalent of 1.58 is:  A 0.158%                      B 1.58%                      C 15.8% D 158%                      E 1580%	2.  D
3.	The correct working line to express 27 as a percentage of 93 is:  A $\frac{93}{100} \times 27\%$ B $\frac{27}{100} \times 93\%$ C $\frac{93}{27} \times 100\%$ D $\frac{100}{27} \times 93\%$ E $\frac{27}{93} \times 100\%$	3.  E
4.	The new price when an item marked at \$45 is marked up by 14%  A \$51.40                      B \$53.70                      C \$51.30 D \$53.60                      E \$52.50	4.  C
5.	If 30% of an amount of money is \$22.50, how much is 20% of that amount?  A \$12.50                      B \$15.00                      C \$17.50 D \$13.75                      E \$16.25	5.  B
6.	Find 12 $\frac{1}{2}$ % of \$980	6.  \$122.50
7.	Decrease \$88.50 by 8%	7.  \$ 81.42
8.	A car was bought for \$92500 and sold one year later for \$78000. Calculate the loss as a percentage of the original price. Express your answer correct to 1 decimal place.	8.  15.7%

		ANSWERS
9.	Write 15.5% as a simple fraction	9. $\frac{31}{200}$
10.	Express 345 grams as a percentage of 4kg.	10. $8.625\%$
11.	Daniel earns \$400 a week. He pays 15% of this in tax. How much tax does he pay in a year? (1 year = 52 weeks).	11. \$3120
12.	Toni invests \$8000 in an account earning 6% p.a simple interest. How much interest does Toni earn on this investment in 5 years?	12. \$2400

### Question 3

### Algebra

(12 marks)

### Answer

1.	One tenth of the sum of $x$ and 9 can be written as: A $\frac{1}{10} + x + 9$ B $\frac{x}{10} + 9$ C $\frac{x}{10} + \frac{9}{10}$ D $\frac{1}{10} \times x + 9$ E $\frac{x}{10} \times 9$	1. C
2.	The value of $x^3 - x^2 - 4y$ if $x = -3$ and $y = 4$ is: A -52      B 2      C -43 D -34      E 20	2. A
3.	Which of the following expressions is the same as: $(3a^2b)^3$ ? A $9a^6b^3$ B $9a^5b^3$ C $27a^5b^4$ D $27a^5b^3$ E $27a^6b^3$	3. E
4.	The statement $7a + 9b - 2ab + 8ba + 2a - 2b$ when simplified by combining the like term is: A $9a - 7b + 6ab$ B $9a + 7b - 2ab + 8ba$ C $9a + 7b + 6ab$ D $9a - 9b - 6ab$ E $9a + 9b - 6ab$	4. C

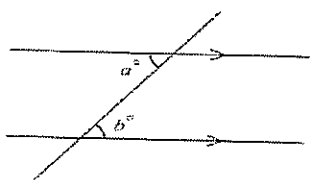
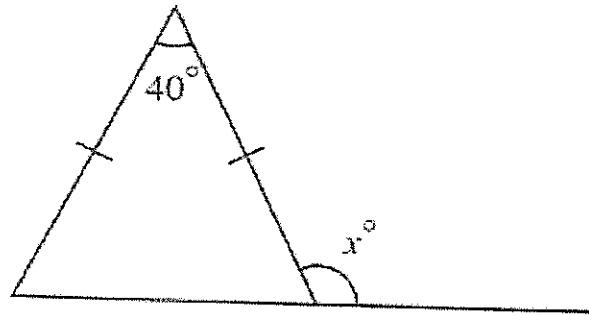
5.	The expression $\frac{12x^3+4x}{2x}$ when simplified is:  A $6x^2 + 2$ B $6x^2 + 4x$ C $12x^2 + 4x$ D $6x^3 + 2$ E 8	5.  A
6.	Expand and simplify  $7(b + 2a) - 6a$	6.  $8a + 7b$
7.	Simplify $7a^4b^6 \times 2a^8b^2$	7.  $14a^{12}b^8$
8.	Simplify $7x + 4y - 10x + y^2$	8.  $-3x + 4y + y^2$
9.	Simplify $5^9 \div 5^7$	9.  $5^2$ or 25
10.	If $x$ is an even number then an expression for the next even number is?	10.  $x + 2$
11.	Fully factorise $16ab - 24a^2$	11.  $8a(2b - 3a)$
12.	Simplify $7 + 8a^0$	12.  15

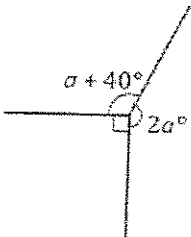
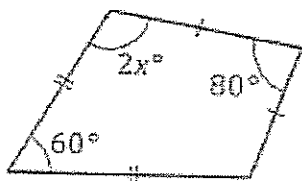
## Question 4

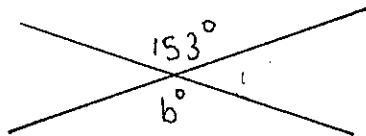
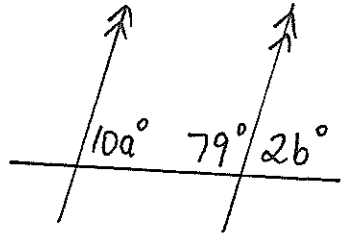
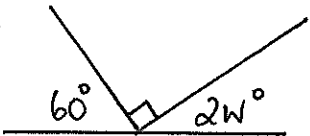
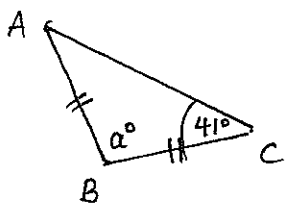
## Geometry

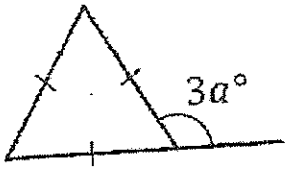
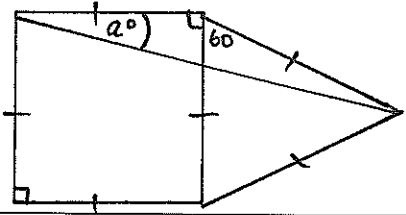
(12 marks)

Answer

1.	<p>In the following diagram, a and b are:</p>  <p> A vertically opposite      B corresponding  C co-interior      D alternate  E complementary </p>	1.	D
2.	<p>A rhombus has:</p> <p> A All sides of equal length and one pair of equal angles  B Two pairs of equal length sides and one pair of equal angles  C All sides of equal length and two pairs of equal angles  D Two pairs of equal length sides and two pairs of equal angles  E None of the above </p>	2.	C
3.	<p>The value of <math>x</math> in the following diagram is:</p>  <p> A 90      B 110      C 50  D 65      E 120 </p>	3.	B

4.	<p>Which of the following is true for the diagram below?</p>  <p>A <math>3a + 40 = 360</math>      B <math>2a = a + 40</math>      C <math>3a + 40 = 270</math> D <math>a = 60</math>      E <math>2a - (a + 40) = 0</math></p>	4.  C
5.	<p>For the kite shown below, the value of <math>x</math> is:</p>  <p>A 60      B 80      C 110 D 55      E 40</p>	5.  D

6.	<p>Write down the reason for each of the following</p> <p>a.</p>  <p><math>b = 153</math></p> <p>b.</p>  <p><math>10a = 2b</math></p> <p>c.</p>  <p><math>60 + 90 + 2w = 180</math></p>	<p>Reason</p> <p><u>vertically opposite</u></p> <hr/> <p>Reason</p> <p><u>corresponding angles</u> <u>in parallel lines</u></p> <hr/> <p>Reason</p> <p><u>Angle sum of a</u> <u>straight line</u></p> <hr/>
7.	<p>Find the value of <math>a</math> in this diagram giving reasons.</p> 	<p>ANSWER HERE</p> <p><math>a + 82^\circ = 180^\circ</math>  <math>a = 98</math></p> <p>(angle sum of <math>\triangle ABC</math> is <math>180^\circ</math>)</p>

8.	Find the value of $a$ in each of these diagrams. (Reasons not required).	
a.		$3a = 120$ <hr/> $a = 40$ <hr/>
b.		$2a + 150 = 180$ <hr/> $a = 15$ <hr/>

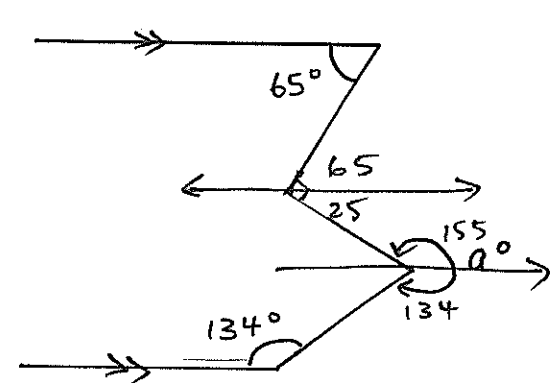
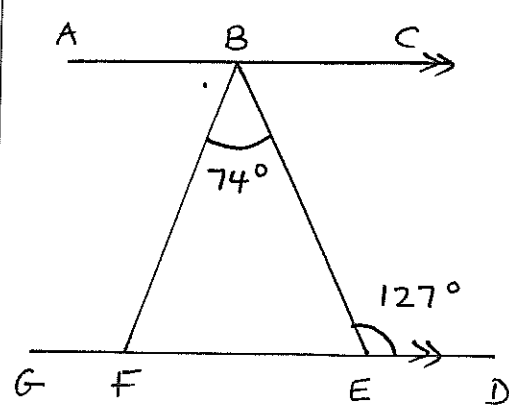
ANSWER IN THE SPACE PROVIDED

Mark

1.	<p>The diagonal of a rectangle is 45mm. The rectangles length is twice the breadth.</p> <p>Calculate the <i>exact</i> breadth of the rectangle.</p> <p><b>ANSWER AND WORKING HERE</b></p> $(2x)^2 + x^2 = 45^2$ $5x^2 = 2025$ $x^2 = 405$ $x = \sqrt{405}$ <p>breadth is <math>\sqrt{405}</math> mm</p>	2 marks
2.	<p>A measurement of 72cm is increased by 20% and then the result is decreased by 20%</p> <p>What is the overall percentage change?</p> $72 \times 1.2 \times 0.8 = 72 \times 0.96$ <p><math>\therefore</math> Decrease of 4%</p>	1 mark
3.	<p>James sells second hand cars. His commission is based on a sliding scale of 6% on the first \$2000 of his sales, 3.5% on the next \$1000, and 2% thereafter.</p> <p>What is James' commission on a car selling for \$5670?</p> $0.06 \times 2000 + 0.035 \times 1000 +$ $0.02 \times 2670 = \$208.40$	2 marks



4.	<p>Fully simplify</p> <p>a) <math>7(2x + 3y - 2) - (x + 3y + 1)</math></p> $\frac{14x + 21y - 14 - x - 3y - 1}{= 13x + 18y - 15}$ <p>b) <math>\frac{(6w^4)^2 \times \frac{1}{3}w^2}{4w^3 + 2w^3}</math>      <math>\frac{36w^8 \times \frac{1}{3}w^2}{6w^3} = 2w^7</math></p>	4 marks
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5.	 <p>Find the value of <math>a</math> in this diagram</p> <p>(Not to scale)</p> <p>ANSWER <u>289°</u></p>	1 mark
6.	 <p>Find giving reasons the size of <math>\angle ABF</math></p> <p><u><math>\angle CBE = 53^\circ</math></u> (cointerior angles <math>AC \parallel GD</math>)</p> <p><u><math>\angle ABF = 53^\circ</math></u> (angles on a straight line)</p> <p>(Not to scale)</p>	2 marks