

TAFE ID	329428800	Result Slip No	S2387541
Student Name	Rachel Loveday	Date marked	14/08/2021

**Student Feedback
Mathematics
Assignment 6492MD 2**

Result	$\frac{31.5}{52.50} = 63\%$
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	Max mark	mark	Teacher's Comments
Q1 to 10			
1	1	1	D
2	1	0	A
3	1	0	C
4	1	1	C
5	1	1	C
6	1	0	C
7	1	0	B
8	1	1	D
9	1	0	A
10	1	1	B

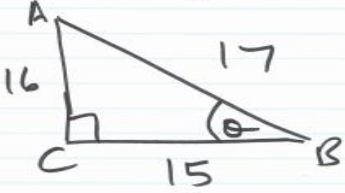
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		① <u>Assignment 2</u> Q1) A X Q2) D X Q3) D X Q4) C ✓ Q5) C ✓ Q6) D X Q7) C X Q8) D ✓ Q9) D X Q10) B ✓ The equation of the straight line $3x - 2y = 3$ can be rearranged to the gradient-intercept form: $y = mx + c$, where m is the gradient and c is the y-intercept. $2y = 3x - 3$ $y = \frac{3}{2}x - \frac{3}{2}$ Q1: The gradient is $\frac{3}{2}$. Q2: The y-intercept is $-\frac{3}{2}$. Q3: The x-intercept has $y = 0$. Substitute into the original equation: $3x - 2 \times 0 = 3$ $3x = 3$ $x = 1$ Q6: There is a double root and a single root thus the degree is 3. Q7: The zeros are -2, zero and 3 from the diagram therefore the equation is

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			$y = x(x + 2)(x - 3)$ which is B. Q9: First find the gradient of the given line by rearranging it to the gradient-intercept form: $y = mx + c$, where m is the gradient and c is the y-intercept. $3y = 2x + 2$ $y = \frac{2}{3}x + \frac{2}{3}$ The gradient of this line $m_1 = \frac{2}{3}$. If the gradients of perpendicular lines are multiplied, their product is -1: $m_1 \times m_2 = -1 \text{ or } m_2 = -\frac{1}{m_1}.$ Using this property, find the gradient of the line that is perpendicular to the given line: $m_2 = -\frac{1}{m_1} = -\frac{1}{\left(\frac{2}{3}\right)} = -\frac{3}{2}.$ Using the point-gradient equation of a straight line: $y - y_1 = m(x - x_1)$ $y - 4 = -\frac{3}{2}(x - 4)$ $2y - 8 = -3x + 12$ $2y - 8 = -3x + 12$ $3x + 2y - 20 = 0$
total	10	4	
Q11			
	1	1	Correct application of formula
	1	1	Correct answer

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			② Q11) As my answer to Q10 was 60°, which I found by using the following equation  $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ $= \frac{15}{17}$ $= 0.998814229$ $= 59^\circ 59' 59.57$ $= 60^\circ$ To calculate the area of the triangle, I will use the following measurements: $a = 15$ $b = 17$ ③ Q11) (Continued) $A = \frac{1}{2} ab \sin C$ $A = \frac{1}{2} (15)(17) \sin 60^\circ \quad \checkmark$ $A = 110.418239$ $A = 110.42 \text{ units}^2 \quad \checkmark$ N.B. units^2 used as units (cm or m) wasn't made clear in Q10 or Q11.
Q11 total	2	2	

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Q12			
	1	1	Correct answer 108°
			Q12) π radians = 180° radians to degrees = $\frac{180}{\pi}$ $\pi = 180^\circ$ $\frac{3\pi}{5} = \frac{3(180^\circ)}{5}$ ✓ $= 108^\circ$ ✓
Q12 total	1	1	
Q13			
a	0.5	0.5	Correct I equation $I = 157N$
b	0.5	0	Correct C equation $C = 5000 + 43N$
c	1	1	Sets up $I = C$
	1	1	Solves for N

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			④ Q13) a) $I = 157N$ ✓ b) $C = 5000 + 43N$ ✗ c) At the break-even point: Income = overhead costs $I = 157N$ ✓ $C = 5000 + 43N$ $157N = 5000 + 43N$ $+43N$ $+43N$ $\frac{200N}{200} = \frac{5000}{200}$ $N = \frac{5000}{200}$ ∴ The break-even point is where the electronics manufacturer sells 25 headphones. <i>I = C for break even</i> $157N = 5000 + 43N$ $114N = 5000$ $N = 43.8 \dots$ ∴ 44 headphones Correct method.
d	1	1	Correct P equation

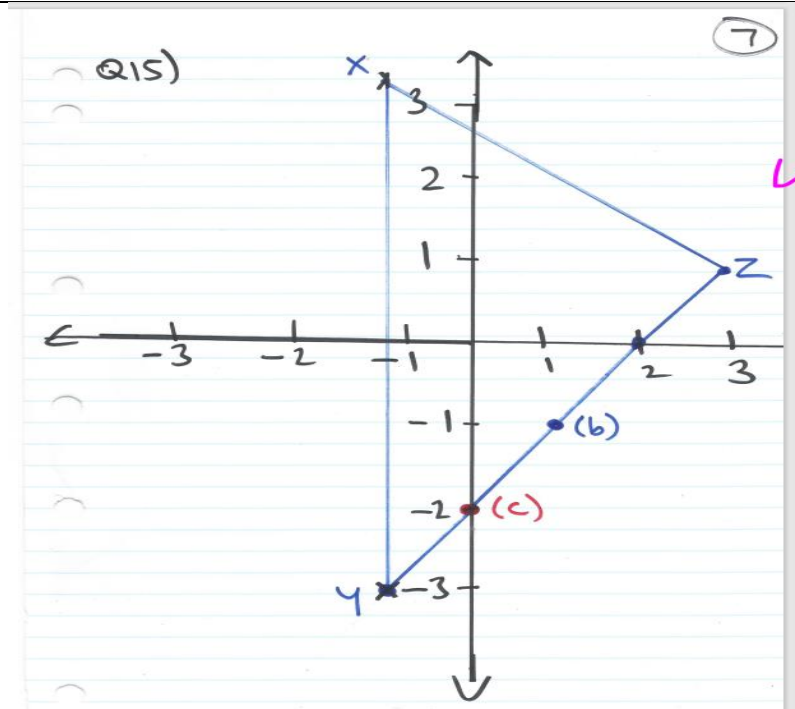
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			⑤ Q13) d) Based on the break-even point calculated in part (c) of this question, the equation linking the manufacturer's profit and the number of headphones sold (N) is as follows: $P = 200N - 5000$ Where 200N is 157N (income) + 43N (variable cost) and 5000 is (fixed cost). The income has to be bigger than the fixed cost and the variable cost together to make a profit. $P = I - C$ $= 157N - 5000 - 43N$ $= 114N - 5000$ Correct method.
e	1	1	Correct N
			e) $P = 200N - 5000$ $20,000 = 200N - 5000$ $+5000 \quad +5000$ $\frac{25,000}{200} = \frac{200N}{200}$ N = 125 ∴ 125 headphones must be sold to make a profit of \$20,000. Proof: $P = 200N - 5000$ $P = (200 \times 125) - 5000$ $P = 25,000 - 5,000$ $P = \$20,000$ Correct method.

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			$P = 114N - 5000$ $20000 = 114N - 5000$ $25000 = 114N$ $N = \frac{25000}{114}$ $N = 219.29$ $\therefore 220 \text{ headphones}$ If you substitute 219, you get less than \$20 000 profit: $157 \times 219 - 5000 = \\$19\,966$ In this case, round up to 220: $157 \times 220 - 5000 = \\$20\,080$ which is just over \$20 000.
Q13 total	5	4.5	
Q14			
	2	2	Sets up two equations
			(6) Q14) $f(x) = ax^2 + b$ $f(2) = 5$ $f(3) = 20$ $f(2) = a(2)^2 + b$ $f(2) = 4a + b \quad \checkmark$ $5 - 4 = 1$ $a = 1, b = 1$ $(4 \times 1) + 1 = 5$ $f(3) = a(3)^2 + b$ $f(3) = 9a + b \quad \checkmark$ $20 - 9 = 11$ $a = 1, b = 11$ $(9 \times 1) + 11 = 20$ These don't match. $f(2) = 5 \Rightarrow 4a + b = 5$ $f(3) = 20 \Rightarrow 9a + b = 20$ Subtract both sides of the first equation from the second: $5a = 15$ $a = 3$

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			Substitute a into one of the original equations: $4 \times 3 + b = 5$ $12 + b = 5$ $b = -7$
	2	0	Solves the equations simultaneously $a = 3$, $b = -7$
Q14 total	4	2	
Q15			
a	1	1	Correct Pythagoras' theorem and sketch
	1	1	Correct answer $YZ = 4\sqrt{2}$ units
			

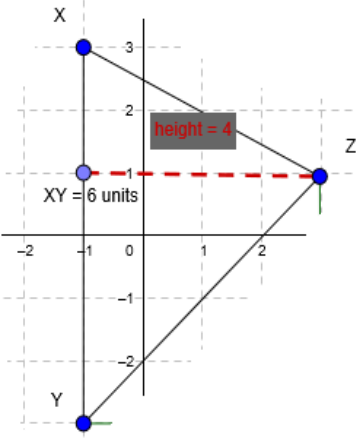
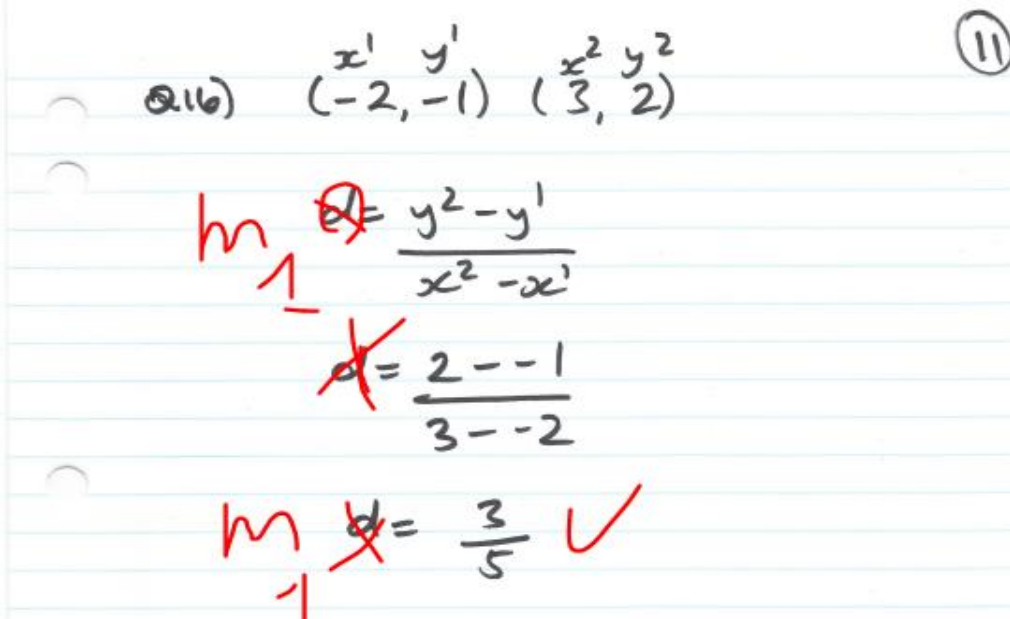
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			Q15) a) $d = \sqrt{(x^2 - x^1)^2 + (y^2 - y^1)^2}$ $1 \quad (-1, -3)$ $2 \quad (3, 1)$ $d = \sqrt{(3 - -1)^2 + (1 - -3)^2}$ $d = \sqrt{(4)^2 + (4)^2}$ $d = \sqrt{32}$ $d = 5.656854249$ $d = 5.66$ $\therefore 12 = 5.66$														
b	2	2	Correct equation for YZ														
			b) <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr></table> $y = x - 2$ Q15) (continued) c) <u>gradient</u> $\downarrow$ $m = \frac{y^2 - y^1}{x^2 - x^1}$ $m = \frac{1 - (-3)}{3 - -1}$ $= \frac{-2}{4}$ $m = -\frac{1}{2}$ Find the gradient first using the gradient formula: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 1}{-1 - 3} = \frac{-4}{-4} = 1$	x	-1	0	1	2	3	4	y	-3	-2	-1	0	1	2
x	-1	0	1	2	3	4											
y	-3	-2	-1	0	1	2											

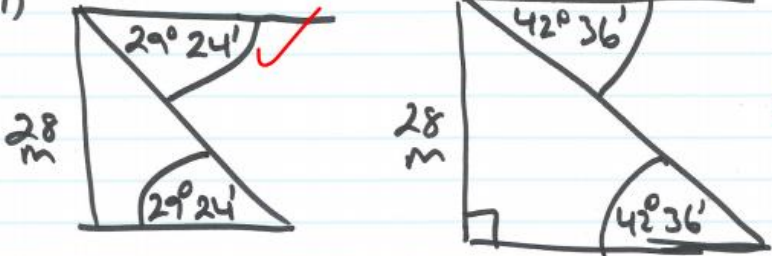
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			Use the point-gradient equation of a straight line: $y - y_1 = m(x - x_1)$ $y - 1 = 1(x - 3)$ $y = x - 2 \text{ or } x - y - 2 = 0$
c	1	0	$m = 1, \quad b = -2$ both correct = 1, 1 wrong = 0
d	1		Correct formula for distance between a point and a line
	1		Correct distance Distance formula is not in the new syllabus. Q15d should be deleted
			not done Q15)(Continued) d) This part of the question was not answered as instructed in the OLS. e) As both lines XZ and YZ converge at (3, 1), this triangle is an <u>isosceles</u> triangle. Therefore both lines/sides XZ and YZ are 5.66 units. Now to find line XY $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $d = \sqrt{(-1 - 1)^2 + (-3 - 3)^2}$ $d = \sqrt{(-2)^2 + (-6)^2}$ $d = \sqrt{40}$ $d = 6.32 \text{ units}$ X $A = \frac{1}{2}bh$ $A = \frac{1}{2} \times 6.32 \times 5.66$ $A = 17.89 \text{ units}^2$ X
e	1	0	Correct area of triangle

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			 area = half base times height $= \frac{1}{2} \times 6 \times 4$ $= 12 \text{ units}^2$
Q15 total	6	4	
Q16			
	1	1	Correct gradient using the given points
	1	0	Correct gradient using the equation of the given line
	1	0	Using the perpendicular relationship, writes a equation involving d
	1	0	Correct answer for d
			

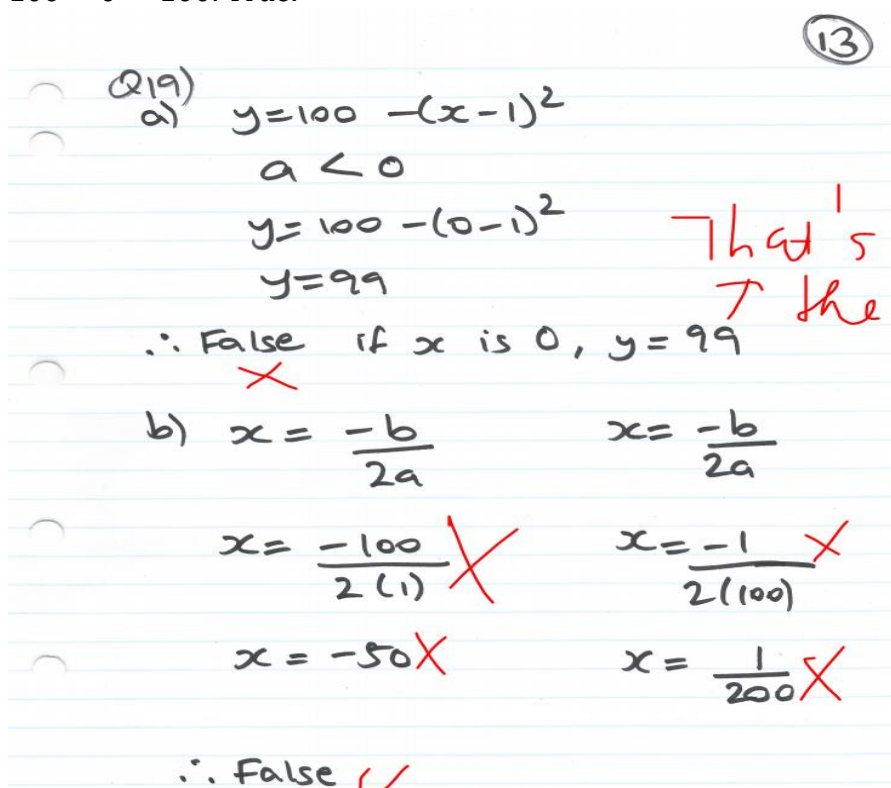
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			$m_1 = \frac{3}{5},$ $m_2 = -\frac{d}{2}$ Lines are perpendicular $\Rightarrow m_1 m_2 = -1$ $\frac{3}{5} \times -\frac{d}{2} = -1$ $d = 3\frac{1}{3}$
Q16 total	4	1	
Q17			
	1	1	correct angles of depression on diagram
	2	2	Obtains expressions for the distances between the foot of the cliff and the two positions of the boat using tangent or cotangent
	2	2	Correct answer for the distance travelled by the boat: 19 m or 19.2 m or 19.24 m (no mark deducted for rounding error)
			Q17)  $x = \frac{28}{\tan 29^\circ 24'}$ $x = \frac{28}{\tan 42^\circ 36'}$ $x = 49.69199468\text{m} \quad x = 30.44977125$ $49.69199468 - 30.44977125 = 19.24222343$ The boat has travelled 19.24m.
Q17 total	5	5	

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	Max mark	mark	Teacher's Comments
Q18			
	1	1	Correct application of sine rule
	1	0.5	Correct answer
			this typo, Rachel Q18) There is a typo in the question. The question asks to find the length of the side AC correct to the nearest centimetre (cm). However the given side is in metres (m). The question is on the final page of my submission for reference. As the given side is in (m), my answer will be in (m). As only one side has been given, I will be using the sine rule to find the length of side AC. $\frac{a}{\sin A} = \frac{b}{\sin B}$ $\frac{x}{\sin 64^\circ} = \frac{19.2}{\sin 53^\circ 33'}$ $x = \frac{19.2 \sin 64^\circ}{\sin 53^\circ 33'}$ $x \text{ (or AC)} = 21.45371507 \text{ m}$ $= 21 \text{ m}$ ✓ ✓ ✓ X AC = 21.453 ... m = 2145.3 ... cm = 2145 (correct to the nearest cm)
Q18 total	2	1.5	

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Q19			
	6	4	a T b F c T d T e T f F a) $100 - (x - 1)^2$ has a maximum value when $(x - 1)^2$ is the smallest. Any number squared is either positive or zero so the minimum is zero and that is when $x = 1$. Therefore, the maximum value is $100 - (1 - 1)^2 = 100 - 0 = 100$. True.  b) If you had part a right, then you'd know that axis of symmetry is $x = 1$. (trick question, it is not $y = 1$.) False. To show this using your method, Rachel, you need to rearrange the equation: $y = 100 - (x - 1)^2 = 100 - (x^2 - 2x + 1) = 100 - x^2 + 2x - 1$ $y = -x^2 + 2x + 99$ $a = -1, b = 2, c = 99$ $x = \frac{-b}{2a} = \frac{-2}{2 \times (-1)} = \frac{-2}{-2} = 1$

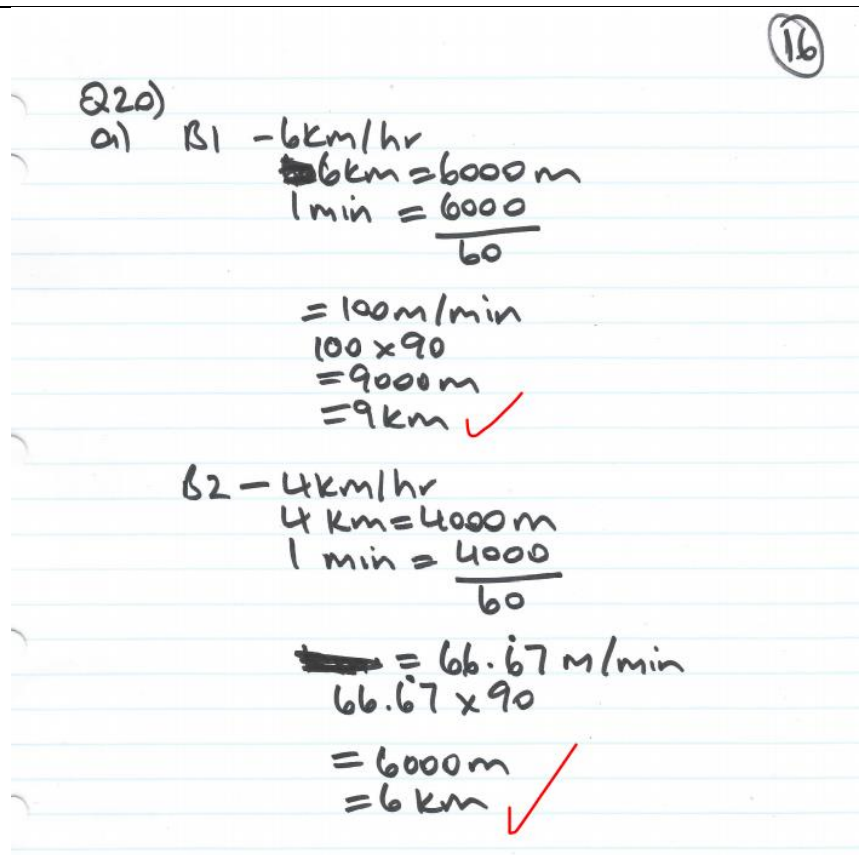
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			(14) Q19) (Continued) c) $y = 100 - (x-1)^2$ $y = 100 - (11-1)^2$ $y = 0$ ✓ $y = 100 - (-9-1)^2$ ✓ $y = 0$ $\therefore$ True ✓ d) $y = 100 - (x-1)^2$ $x = 1$ $y = 100 - (1-1)^2$ $y = 100$ $x = 1, y = 100$ $\therefore$ True ✓

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		$a = -1, b = 2, c = 99$ Q19) (continued) e) $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-1 \pm \sqrt{1^2 - (4 \times 1 \times 100)}}{2 \times 1}$ X $x = \frac{-1 \pm \sqrt{1 - 400}}{2}$ $x = \frac{-1 \pm \sqrt{-399}}{2}$ D $\neq$ 400 for you $\begin{matrix} -1 + -399 = -400 \\ 1 + 399 = 400 \end{matrix}$ $\therefore$ True ✓ e) $100 - (x - 1)^2 = 100 - (x^2 - 2x + 1) = 100 - x^2 + 2x - 1$ $= -x^2 + 2x + 99$ $D = b^2 - 4ac = 2^2 - 4 \times (-1) \times 99 = 4 - (-396) = 4 + 396 = 400$ True. X $x = 1$ f) This graph is symmetrical about the <u>y-axis</u>. This This graph has line symmetry about the y-axis. As the left and right halves are mirror-images of each other, therefore the function is even and the statement is true. $\downarrow$ $\therefore$ True X f) The function is not even since it is not symmetrical to the y-axis (the diagram is given or use answer to part b). It is symmetrical to $x = 1$.

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			This can also be shown by checking whether $f(-x) = f(x)$. $f(-x) = 100 - (-x - 1)^2 = 100 - ((-x)^2 - 2(-x)(-1) + (-1)^2) = 100 - (x^2 - 2x + 1) = 100 - x^2 + 2x - 1 = 99 - x^2 + 2x.$ $f(x) = 100 - (x - 1)^2 = 100 - (x^2 - 2x + 1) = 100 - x^2 + 2x - 1 = -x^2 + 2x + 99$ $f(-x) \neq f(x)$, false.
Q19 total	6	4	
Q20			
a	1	1	Correct distances
			
b	2	1.5	Correct diagram -0.5/error
			9km and 6km are different lengths, Rachel.

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			(17) Q20) (continued) b) This side is longer $360^\circ - 335^\circ = 25^\circ \text{ or } 025^\circ$
c	2	0	Correct application of cosine rule

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			(18) Q20) (Continued) a) For this part of the question I have labelled the applicable side w (for B1) and x (for B2). This can be seen on the diagram drawn for Q20(b). <u>Find w</u> $360^\circ - 335^\circ = 25^\circ$ $\sin 25^\circ = \frac{w}{9}$ X $w = 9 \sin 25^\circ$ $w = 3.803564356 \text{ km}$ <u>Find x</u> $\sin 30^\circ = \frac{x}{6}$ X $x = 6 \sin 30^\circ$ $x = 3 \text{ km}$ Total distance = $w + x$ $= 3.803564356 + 3$ $= 6.803564356$ $= 6.8 \text{ km}$ $\therefore$ B1 and B2 are 6.8km apart when the phone call occurs. X $d^2 = 9^2 + 6^2 - 2 \times 9 \times 6 \cos 55^\circ$ $= 55.05 \dots$ $d = 7.4 \text{ km} \quad (1 \text{ dp})$
Q20 total	5	2.5	

Teacher's Comment
Rachel, You made quite many mistakes. You will need to revise these topics, whenever you have time, while you are continuing with the next Chapter. Regards, Anna