

Question			Answer	Marks	Part marks and guidance	
1	(a)	(i)	$6.5 \times 10^3$	1	In all parts condone trailing zeros	
		(ii)	$5.84 \times 10^{-2}$	1		
	(b)		$7.56 \times 10^3$	1		
2			63	4	<p><b>M1</b> for <math>80 + 65 + 95</math> or 240 seen as total</p> <p><b>M1</b> for <i>their</i> <math>240 \times [0].6</math> or 144</p> <p><b>M1</b> for <i>their</i> <math>144 - 43 - 38</math></p> <p>If <b>0</b> scored <b>SC1</b> for <math>0.6 \times 95</math> or 57</p>	<p>condone <math>\frac{63}{95}</math> for 4 marks and</p> <p>mark the method leading to <i>their</i> answer</p>

Question		Answer	Marks	Part marks and guidance
3		2 [h] 15 [m]	4	<p><b>M3</b> for a fully correct method e.g.</p> $2.5 \times \frac{405}{270} \times \frac{3}{5}$ <p>OR</p> <p><b>M2</b> for three correct steps from</p> $2.5 \times \frac{405}{270} \times \frac{3}{5} \text{ e.g. } 2.5 \times \frac{405}{270} \times 3$ <p>OR</p> <p><b>M1</b> for one correct step e.g.</p> $\frac{270}{2.5}, \frac{270}{150}, \frac{270}{3}, 2.5 \times 3, 150 \times 3, \frac{3}{5}, \frac{405}{270}$ <p>or <math>\frac{405}{5}</math></p> <p>if <b>M0</b> or <b>M1</b> scored allow <b>SC1</b> for <i>their</i> final time as a decimal hour or <i>their</i> final time in minutes correctly converted to hours and minutes e.g. 2.3333[h] = 2[h] 20[min]</p>
				<p><b>M3</b> implied by 2.25, 2 [h] 25 [min] or 135 nfw note : (405 – 270 or 270 ÷ 2) = 135 = 2[h] 15[min] scores <b>M0</b></p> <p><b>M2</b> could be implied by 180, 11.25, 675 or 3 nfw</p> <p><b>M1</b> could be implied by 108, 1.8, 90, 7.5, 450, 0.6, 1.5 or 81</p> <p>allow alternative methods</p>

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4		$\frac{20}{60}$ oe	5	<p><b>B3</b> for <math>x=7</math></p> <p>OR</p> <p><b>B1</b> for <math>x + 2x + x - 1 + 5x - 2</math> or better</p> <p><b>M1</b> for simplifying <i>their</i> linear equation to the form <math>ax + b = c</math> or better e.g. <math>9x - 3 = 60</math></p> <p><b>M1</b> for <math>x = (60 + 3) \div 9</math></p> <p>AND</p> <p><b>M1</b> for <math>\frac{\text{their}20}{60}</math></p> <p>If 0 scored <b>SC1</b> for <math>\frac{3x-1}{60}</math></p>	<p>Equivalent includes <math>\frac{1}{3}</math>, .333[.] and 33.3...%</p> <p>e.g. <math>9x - 3</math></p> <p><i>their</i> linear equation must include 60</p> <p>FT <i>their</i> linear equation and show the steps to correctly solve it.</p> <p>third <b>M1 FT</b> <i>their</i> value of <math>x</math> so <i>their</i> 20 is <i>their</i> <math>(3x - 1)</math> evaluated with <i>their</i> value of <math>x</math></p>
5	(a)	Accurate ruled angle B bisector with two pairs of correct arcs	2	<b>B1</b> for accurate ruled angle B bisector	Tolerance $\pm 2^\circ$ e.g. one angle $49^\circ$ to $53^\circ$ and the line can be any length, must touch B and condone dotted line
	(b)	Accurate ruled perpendicular bisector of BC with two pairs of correct arcs	2	<b>B1</b> for accurate ruled perpendicular bisector of BC	Tolerance $\pm 2^\circ$ e.g. angle $88^\circ$ to $92^\circ$ and $\pm 2\text{mm}$ e.g. 27mm to 31 mm and line can be any length, must touch BC and condone dotted line
	(c)	Correct region shaded	1 dep	<b>dep</b> on at least <b>B1</b> and <b>B1</b> and both bisectors intersecting	

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6		482	4	<p><b>M1</b> for <math>6 \times 8 \times 15</math> or 720</p> <p><b>M1</b> for <math>\sqrt[3]{\text{their } 720}</math> or 8.96...</p> <p><b>M1</b> for <math>[6 \times] (\sqrt[3]{\text{their } 720})^2</math></p>	<p><b>M3</b> implied by 80.3[3...] or 481.99...</p> <p><b>M2</b> implied by 8.96..</p> <p>i.e <math>[6 \times] (\text{their } 8.96\dots)^2</math></p>
7	(a)	<p>Any correct reason e.g.</p> <p>two points identified e.g (-2,-6) and (2,4) or a triangle drawn on the graph</p> <p>and</p> <p>[gradient = ]</p> <p>e.g <math>\frac{4 - -6}{2 - -2}</math> (could be marked on graph)</p> <p><math>= \frac{10}{4} = (\frac{5}{2}</math> or 2.5) oe</p>	1	<p>reason has to be fully correct</p> <p>condone triangle with base 1 and height 2.5 providing it is clear</p> <p>alternative 1: e.g.</p> <p><math>-6 = m(-2) + -1</math></p> <p>leading to <math>m = (-6 + 1) \div -2 = \frac{-5}{-2} = (\frac{5}{2}</math> or 2.5)</p> <p>alternative 2 :</p> <p><math>-6 = m(-2) + c</math></p> <p><math>4 = m(2) + c</math></p> <p>subtract</p> <p><math>-10 = m(-4)</math></p> <p><math>\frac{-10}{-4} = (\frac{5}{2}</math> or 2.5) oe</p>	
	(b)	$y = 2.5x - 1$	2	<b>B1</b> for $y = 2.5x + c$ ( $c \neq -1$ )	condone $\frac{5}{2}$ for 2.5

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8		46.77 to 46.84 or 47 nfww  or (using 9)  47.45 to 47.5 or 48 nfww	6	<p><b>B2</b> for 9, 9.9, 9.975, 9.98 or 10</p> <p>or <b>M1</b> for [faulty = ] <math>\frac{6}{80}</math> [<math>\times 133</math>] oe</p> <p>AND</p> <p><b>M1</b> for [costs = ] <math>133 \times (32 + 7) + \textit{their} 10 \times 25</math> oe or <math>\textit{their} 5187 + \textit{their} 10 \times 25</math></p> <p><b>M1</b> for [income = ] <math>133 \times 60</math></p> <p><b>M1</b> for [percentage profit = ]  <math display="block">\frac{\textit{their} 7980 - \textit{their} 5437}{\textit{their} 5437} [\times 100]</math> oe or  <math display="block">\left(\frac{\textit{their} 7980}{\textit{their} 5437} - 1\right) [\times 100]</math> oe</p>
9	(a)	Point accurately plotted and line drawn	1	for the '4' mark intent and 32 must lie between 30 and 35 and not on the lines, condone solid/dotty line
	(b)	Correct comment e.g. it peaks in Q1 or the lowest is in Q3	1	Condone winter/spring for Q1 and summer/autumn for Q3 and in (b)(c)(d) mark best comment unless contradictory
	(c)	Correct comment e.g. there is a slight rise in sales year on year	1	
	(d)	The trend in her sales will continue [at a similar rate] oe	1	Accept any correct relevant comment referring to general trend or quarter 1 trend isw extra statements

10		142.2[0] with correct working	6	<p><b>M1</b> for <math>36^2</math> or 1296</p> <p><b>M1</b> for <math>k \times \pi \times 18^2</math> oe where <math>k = \frac{1}{2}, 1, 1\frac{1}{2}</math> or 3</p> <p>AND</p> <p><b>M1</b> for <i>their</i> area <math>\times 30</math></p> <p><b>M1</b> for <i>their</i> mass <math>\div 1000</math> and <math>\div 10</math> or counting up in 10 000s to <i>their</i> mass</p> <p>AND</p> <p><b>M1</b> for <i>their</i> <math>9 \times 15.8</math></p> <p>If <b>0, 1 or 2</b> scored instead award <b>SC3</b> for answer of 142.2[0] with insufficient working</p> <p>If <b>0 or 1</b> scored instead award <b>SC2</b> for 2822 to 2823.02</p> <p>If <b>0</b> scored award <b>SC1</b> for 1526 to 1527.02, 1017 to 1018.008, 508 to 509.004, 3051 to 3054.024, <math>162\pi</math>, <math>324\pi</math>, <math>486\pi</math> rot to at least nearest integer</p>	<p>Correct working requires <b>M1</b> AND <b>M1</b> AND <b>M1</b></p> <p><b>M2</b> implied by 2822 to 2823.02 or <b>M1</b> implied by 1526 to 1527.02, 1017 to 1018.008, 508 to 509.004, 3051 to 3054.024, <math>162\pi</math>, <math>324\pi</math>, <math>486\pi</math> rot to at least nearest integer</p> <p><i>their</i> area cannot be 36 and <b>M1</b> implied by 84660 to 84 690.6 or 84.66 to 84.7</p> <p><i>their</i> mass is attempt at (rectangle and circle(s)) <math>\times 30</math>, <b>M1</b> implied by 8.46 to 8.47</p> <p><i>their</i> 9 <b>dep.</b> on fourth <b>M1</b> scored <b>with a rounding up to next integer</b></p>
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11	(a)	4.715 4.725	2	B1 for each or both correct and reversed	
	(b)	7 25	5	<p>B4 for 7.41[0...] or 7.411 OR B1 for 425 used B1 for 57.35 or 57.349[9...] used If B0 then B1 for 425 and 57.35 seen AND M2 for <math>425 \div 57.35</math> or M1 for use of distance <math>\div</math> speed e.g <math>430 \div 57.3</math></p> <p>If 4 or 5 not scored SC1 for correctly changing <i>their</i> part hour to minutes</p>	<p>Condone use of 57.349[9...] for M2 and for M1 <math>420 \leq \text{distance} \leq 440</math> and <math>56 \leq \text{speed} \leq 58</math></p>
12	(a)	Triangle at (-1,3) (-1,5) (-4,3)	2	B1 for either a correct translation 6 left or a correct translation 2 up	
	(b)	Rotation [centre] (0, 0) 90° clockwise or -90° or 270° anti-clockwise	1 1 1	<p>if 0 or 1 scored B1 for correct reflection in <math>y = x</math> on graph B1 for correct reflection in x-axis on graph</p>	mark to the candidate's advantage, for centre accept origin and O
13	(a)	Fully correct box plot	3	<p>B1 for median at 31 B1 for highest at 38 and lowest at 15 B1 for UQ at 35 and LQ at 24</p>	
	(b)	16	2	M1 for 21 or 37	

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	(c)	Accept "No" and any correct reasoning e.g. consistency is measured by [interquartile] range and Bev's range is higher so less consistent	2	<b>B1</b> for mention of [interquartile] range or spread or unclear acceptable statement	See appendix

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14		15.6[1..] with correct working	6	<p><b>M2</b> for <math>[\sin B = ] \frac{15 \times \sin 72}{18}</math> oe</p> <p>or <b>M1</b> for <math>\frac{\sin B}{15} = \frac{\sin 72}{18}</math> oe</p> <p>AND</p> <p><b>M1</b> for <math>180 - 72 - \textit{their} 52.4</math> implied by <math>55.6</math> or <math>55.57\dots</math></p> <p>and</p> <p><b>M2</b> for <math>[AB=] \frac{18 \times \sin \textit{their} 55.57\dots}{\sin 72}</math> oe</p> <p>or <b>M1</b> for <math>\frac{[\dots]}{\sin \textit{their} 55.57\dots} = \frac{18}{\sin 72}</math> oe</p> <p>If <b>0</b> scored award <b>SC2</b> for 15.6... with insufficient working</p>	<p>Correct working requires evidence of at least <b>M1</b> AND <b>M1</b></p> <p><b>M2</b> implied by 0.7925... or 52.4...</p> <p>Alternative cosine rule (<math>AB = x</math>)</p> <p><b>M3</b> for quadratic equation with coefficients evaluated</p> <p><b>M2</b> for <math>x^2 + (-2 \times 15 \times \cos 72)x + (15^2 - 18^2) = 0</math> oe or</p> <p><b>M1</b> for <math>18^2 = x^2 + 15^2 - 2 \times x \times 15 \cos 72</math></p> <p>AND</p> <p><b>M2</b> for correct use of quadratic formula or <b>M1</b> for use of quadratic formula with at most two errors</p>

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15	(a)	<p>Correct reason e.g. the factors give +2x or factors are <math>(3x - 5)(x + 1)</math> or the signs are the wrong way round</p> <p><math>(3x - 5)(x + 1)</math> and -1 and <math>\frac{5}{3}</math> oe</p>	<p><b>B1</b></p> <p><b>B2</b></p>	<p><b>B1</b> for the correct factorisation or two correct solutions <b>FT</b> from their incorrect factorisation</p>	See appendix
	(b)	<p>Correct reason e.g. the <math>-b</math> term should be in the numerator or</p> $\frac{-(-8) \pm \sqrt{(-8)^2 - 4 \times 2 \times 3}}{2 \times 2}$ $\frac{-(-8) \pm \sqrt{(-8)^2 - 4 \times 2 \times 3}}{2 \times 2}$ <p>and 0.419 and 3.58</p>	<p><b>B1</b></p> <p><b>B2</b></p>	<p><b>B1</b> for <math>\frac{-(-8) \pm \sqrt{(-8)^2 - 4 \times 2 \times 3}}{2 \times 2}</math> or 0.419 and 3.58 or 0.4188..., 0.4189 or 0.419 and 3.58[1...]</p>	<p>allow [+] 8 for <math>-(-8)</math> throughout this part</p> <p>see appendix</p>
16		<p><math>y = \frac{50}{x^2}</math> final answer</p>	<p><b>3</b></p>	<p><b>M2</b> for <math>2 = \frac{k}{5^2}</math> or better OR <b>M1</b> for <math>y = \frac{k}{x^2}</math> oe or <b>B1</b> for <math>[k =] 50</math></p>	Condone proportionality symbol for equals in <b>M1</b>

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17		$x^3 + 2x^2 - x - 2$ final answer	3	<b>M2</b> for the correct expansion and simplification of any two of the given brackets e.g. $x^2 - 1$ , $x^2 + 3x + 2$ or $x^2 + x - 2$ or <b>M1</b> for expansion of any two of the given brackets with three correct terms	the x term counts as two correct terms
18	(a)	$\frac{6}{-3}$ or -2 and $\frac{-1}{\text{their } -2}$ [= $\frac{1}{2}$ ] oe	1  1	accept any correct method	Only award full marks if no wrong working condone $\frac{-6}{3}$ for first mark
	(b)	$y = \frac{1}{2}x + 7\frac{1}{2}$ oe	2	<b>B1</b> for $y = \frac{1}{2}x + c$ or $y = mx + 7\frac{1}{2}$ or the equation of any line which goes through (-3, 6)	where $m \neq 0$
19	(a)	975	3	<b>M2</b> for $(\frac{40+25}{2}) \times 30$ oe or $\frac{1}{2} \times 15 \times 30 + 25 \times 30$ or <b>M1</b> for one relevant area e.g. $\frac{1}{2} \times 15 \times 30$ or $25 \times 30$ or $40 \times 30$	Alternative: $40 \times 30 - \frac{1}{2} \times 15 \times 30$ for <b>M2</b>
	(b) (i)	9	2	<b>M1</b> for $\frac{24-6}{4-2}$ oe	For <b>M1</b> condone one error in the figures
	(ii)	tangent drawn at $x = 4$  12 nfw and dep on tangent drawn	1  3	<b>M1</b> for using two points on <i>their</i> line  <b>M1</b> for use of $\frac{\text{difference in } y}{\text{difference in } x}$	Tangent should not cross the curve and should touch at 4, condone slight daylight between tangent and curve accept range of 11 to 13 for answer which should be checked from <i>their</i> tangent

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20	<p>[x =] -5      [y =] -3  [x =] 3        [y =] 5  with some algebraic working</p>	6	<p><b>M1</b> for <math>x^2 + (x+2)^2 = 34</math></p> <p><b>M1</b> for expanding <i>their</i> square term e.g. <math>x^2 + 4x + 4</math></p> <p><b>M1</b> for simplifying <i>their</i> quadratic expression e.g. <math>2x^2 + 4x + 4 = 34</math> or better</p> <p><b>M1</b> for correctly factorising <i>their</i> quadratic expression <math>ax^2 + bx + c = 0</math>  e.g. <math>(x + 5)(x - 3)</math> or <math>(2x + 10)(x - 3)</math> or use of quadratic formula with no more than two errors</p> <p><b>B1FT</b> for either one correct point or two correct x values  <b>B1FT</b> for the other correct point or two correct y values</p> <p>If insufficient working <b>B2</b> for 4 correct answers or <b>B1</b> for 2 correct answers</p> <p>e.g. <math>x^2 + 2x - 15 = 0</math></p> <p><math>a, b, c \neq 0</math></p> <p>Alternative :  <b>M1</b> for <math>(y - 2)^2 + y^2 = 34</math> or better  <b>M1</b> for <math>y^2 - 4y + 4</math>  <b>M1</b> for <math>2y^2 - 4y + 4 = 34</math> or better  <b>M1</b> for <math>(y - 5)(y + 3)</math> or use of quadratic formula with no more than two errors</p> <p>Both <b>B1s</b> are strict <b>FT</b> from <i>their</i> method to solve <i>their</i> quadratic equation e.g. they must <b>FT</b> correctly from <i>their</i> factorisation</p>