

Paper: 1MA1/1H				
Question	Working	Answer	Mark	Notes
5		70.5	P1 P1 P1 P1 A1	starts process of Pythagoras e.g. $5^2 + 12^2$ complete process for Pythagoras e.g. $\sqrt{5^2 + 12^2}$ or $\sqrt{25 + 144}$ or $\sqrt{169}$ (=13) (dep P1 for Pythagoras) process of adding all the lengths e.g. $5 + 5 + 12 + 12 + "13"$ (=47) (indep) process of multiplying at least 2 lengths by 1.5 cao SC: any evidence of working with Pythagoras award the P1 or P2
6		comparison	M1 A1	starts to manipulate expression e.g. $3y = 9x - 6$ or $3y = 9x - 5$ gives equation(s) which can be used to show that the gradients of the two lines are the same e.g. $y = 3x - 5/3$
7		72	P1 P1 A1	for showing the process of $30 \times 60$ (=1800) or $20 \times 54$ (=1080) (dep P1) for showing the complete process e.g. (" $1800$ " - " $1080$ ") $\div 10$ concluding the answer is 72 (and not 66)
8	(a) (b)	0.00000797 $6.3 \times 10^7$	B1 M1 A1	cao for partial calculation involving powers of 10 e.g. $0.63 \times 10^{5-3}$ or $6.3 \times 10^n$ where $n \neq 7$ or for $n \times 10^8$ or for 63000000 cao
9		500	M1 A1	recognition of 1.2 or 120% oe eg $600 \div 1.2$ oe or $x \times 1.2 = 600$ oe or $120\% = 600$ cao
10		$x^3 + 6x^2 + 11x + 6$	M1 M1 A1	for method to find the product of any two linear expressions (3 correct terms) e.g. $x^2 + x + 2x + 2$ or $x^2 + 2x + 3x + 6$ or $x^2 + x + 3x + 3$ for method of multiplying out remaining products, half of which are correct (ft their first product) e.g. $x^3 + x^2 + 2x^2 + 3x^2 + 2x + 3x + 6x + 6$ cao

Paper 1MA1: 3H				
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6		1.01	P1 P1 P1 A1	fruit syrup $15 \times 1.4 (= 21)$ or water $280 \times 0.99 (= 277.2)$ or apple juice $25 \times 1.05 (= 26.25)$ (dep P1) for complete process to find the total mass e.g. “277.2” + “26.25” + “21” (= 324.45) or a weighted density eg $15 \times 1.4 \div 320 (= 0.065625)$ or $280 \times 0.99 \div 320 (= 0.86625)$ or $25 \times 1.05 \div 320 (= 0.08203125)$ (dep P2) for complete process to find the density eg “324.45” $\div 320 (=1.01..)$ or “0.065625” + “0.86625” + “0.08203125” (= 1.0139..) 1.01 to 1.014
7		5.86	M1 A1	for $\sin 23 = \frac{AB}{15}$ NB Allow any alternative equivalent method to form an equation in $AB$ 5.8 to 5.9
8		5.59	M1 M1 M1 A1	For use of $\pi r^2 = 49$ , where $r$ is the radius or $r = 3.9(49\dots)$ or diameter = $7.8(9865\dots)$ For use of Pythagoras to set up an equation in $x^2$ e.g. $x^2 + x^2 = (d)^2$ or $x^2 = r^2 + r^2$ (dep on M2) Rearrange to $(x^2 =) 2 \times “3.949\dots”^2$ 5.5 to 5.6 For use of trigonometry to set up an equation in $x$ eg $\sin 45 = x \div d$ Rearrange to $(x=) “7.898\dots” \times \sin 45$ oe
9	(a)	180	M1 A1	for evidence of using the LQ (150) and UQ (330) eg $330 - 150$ cao
	(b)	60,180,300,350,650	B2 (B1)	for fully correct box plot for showing a box and at least 3 correctly plotted values
	(c)	Medians 250 and 300	C1	for a correct comparative statement relevant to the question e.g. Yes because the female students have a greater median than the male students

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7	0.319	M1 A1	for partial method eg 1.70(499...) or 16.74 or $\frac{837}{50}$ or 0.101(8516...) or 0.102 or 0.32 for 0.319(1419...)	Accept 0.319 or better. Condone incorrect digits after the 0.319; isw incorrect rounding if 0.319(1419...) is shown in working.
8	(a) Mistake described	C1	for statement describing a mistake <b>Acceptable</b> eg should be $AC^2 - AB^2$ she should do $8^2 - 6^2$ she should be subtracting not adding the numbers she thought that $BC$ was the hypoteneuse when it was actually $AC$ should be $BC^2 + AB^2 = AC^2$ .....should be $8^2 = 6^2 + BC^2$ <b>Not acceptable</b> eg she has not used Pythagoras correctly $6^2 + 8^2$ is 120 the answer should be $\sqrt{28}$ or 5 or 5.3 or 5.2915 $BC + AB = AC$	
	(b) Explanation	C1	for explanation <b>Acceptable examples</b> the scale factor used is 2.5 $5 \div 2$ is not 1.5 $10 \div 4$ is more than 1.5 the scale factor is not 1.5 he has not used the correct scale factor has enlarged it by too much $ZY$ should be 6 <b>Not acceptable examples</b> the grid is not large enough	Note that a diagram alone is insufficient.

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
5	99.5	M1  A1	for $\sin(34) = \frac{x}{178}$ oe <b>or</b> alternative method to find $x$  for answer in range 99.5 to 99.7	If an answer in the range 99.5 to 99.7 is given in the working space then incorrectly rounded, award full marks
6	$\begin{pmatrix} -9 \\ 14 \end{pmatrix}$	M1  A1	for $2\begin{pmatrix} 3 \\ 4 \end{pmatrix} - 3\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ <b>or</b> $\begin{pmatrix} 6 \\ 8 \end{pmatrix}$ <b>and</b> $\begin{pmatrix} 15 \\ -6 \end{pmatrix}$ <b>or</b> $\begin{pmatrix} -9 \\ y \end{pmatrix}$ <b>or</b> $\begin{pmatrix} x \\ 14 \end{pmatrix}$  cao	May be seen in two separate calculations eg $2 \times 3 + -3 \times 5$ and $2 \times 4 + -3 \times -2$ Condone incorrect notation if method is clear for this mark only
7	35.3	P1  P1  P1  A1	for starting the process to find length of third side of triangle, eg $9^2 - 6^2 (= 45)$ <b>or</b> $6^2 + x^2 = 9^2$  for $\sqrt{9^2 - 6^2}$ or $\sqrt{81 - 36}$ or $\sqrt{45}$ or $3\sqrt{5}$ ( $= 6.7..$ ) <b>or</b> $r^2 = 45$  for stating or using $\pi \times [\text{radius}]^2 \div 4$  for answer in range 35.2 to 35.4	[radius] is any value  If an answer in the range 35.2 to 35.4 is given in the working space then incorrectly rounded, award full marks No working, answer only, no marks

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5	41.6	P1	for start of process to find the length of the hypotenuse, eg (hyp <sup>2</sup> =) $8^2 + 10^2 (= 164)$	Note lengths may be seen on the diagram
		P1	for complete process to find hypotenuse, eg $\sqrt{8^2 + 10^2}$ <b>or</b> $\sqrt{64 + 100}$ <b>or</b> $\sqrt{164}$ (= 12.8...)	
		P1	(dep P2) for complete process to find the required perimeter, eg $8 + 8 + 10 + "12.8" + "12.8 - 10"$ <b>or</b> $16 + 4\sqrt{41}$	8 + 8+ "12.8" + "12.8" oe is acceptable for this mark
		A1	for answer in the range 41 to 42	If an answer in the range 41 to 42 is given in the working space then incorrectly rounded, award full marks.
6 (a)	17.8	M1	for $\tan 56 = \frac{x}{12}$ or $(BC) = 12 \times \tan 56$ oe <b>or</b> alternative method to find $BC$	For any alternative method candidates must arrive at an equation with $BC$ as the only unknown
		A1	for an answer in the range 17.7 to 17.8	If an answer in the range 17.7 to 17.8 is given in the working space then incorrectly rounded, award full marks.
(b)	33.6	M1	for $\cos x = \frac{15}{18}$ <b>or</b> $\cos x = 0.83..$ <b>or</b> $x = \cos^{-1} \frac{15}{18}$ <b>or</b> alternative method to find $x$	For any alternative method candidates must arrive at an equation with $x$ as the only unknown
		A1	for an answer in the range 33.5 to 33.91	If an answer in the range 33.5 to 33.91 is given in the working space then incorrectly rounded, award full marks.

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Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	4	P1 A1	$12 \times 5 \div 15$ cao	
(b)	Statement	C1	<p><b>Acceptable examples</b>  it could take more time  it could take less time  it could take more or less time  it would take longer if they worked at a slower rate</p> <p><b>Not acceptable examples</b>  the time will be less as there are more people  if the rate at which the 15 people work changes  it would have taken longer  it would take less time</p>	
10	14.14	P1  P1  P1  A1	<p>works out scale factor eg <math>(9 + 6) \div 6 (= 2.5)</math>  <b>OR</b>  for start of process to find angle <math>DBE</math> eg <math>\sin B = \frac{2}{6}</math> oe</p> <p>uses Pythagoras eg <math>6^2 - 2^2 (= 32)</math> or <math>\sqrt{32} (= 5.6\dots)</math>  <b>OR</b>  calculates <math>AC</math> eg <math>2 \times "2.5" (= 5)</math>  <b>OR</b>  for complete process to find angle <math>DBE</math> eg <math>\sin^{-1}\left(\frac{2}{6}\right) (= 19.4\dots)</math></p> <p>complete process to find <math>CB</math> eg <math>"2.5" \times "\sqrt{32}" (= 10\sqrt{2})</math>  or <math>\sqrt{(9+6)^2 - "5" ^2} (= 10\sqrt{2})</math>  <b>OR</b>  uses trigonometry, eg <math>15 \times \cos "19.4\dots"</math></p> <p>14.1 to 14.15</p>	<p>Note method can be carried out in either order</p> <p>May be seen on diagram</p> <p>If the answer is given within the range but then rounded incorrectly award full marks.</p>

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Question	Answer	Mark	Mark scheme	Additional guidance
13	18.6	M1  A1	for use of Pythagoras eg, $(-5 - 6)^2 + (8 - -7)^2$ or $121 + 225$ or $346$ or $\sqrt{346}$  answer in the range 18.6 to 18.61	If a correct answer within the range is shown in working but incorrectly rounded award full marks
14	Shown	M1  M1  A1	for $(x =) 1.0622\dots$ or $(10x =) 10.622\dots$ or $(100x =) 106.22\dots$ or $(1000x =) 1062.2\dots$ <b>OR</b> for $(x =) 0.0622\dots$ or $(10x =) 0.622\dots$ or $(100x =) 6.22\dots$ or $(1000x =) 62.2\dots$  (dep M1) for a method using two recurring decimals that leads to a terminating decimal difference, using correct multiples of $x$ eg $(1000x - 100x =) 1062.2\dots - 106.22\dots (= 956)$ or $\frac{956}{900}$ <b>OR</b> (dep M1) for a method using two recurring decimals that leads to a terminating decimal difference, using correct multiples of $x$ eg $(1000x - 100x =) 62.2\dots - 6.22\dots (= 56)$ or $\frac{56}{900}$  for completing algebra to $1\frac{14}{225}$	Use of recurring notation acceptable throughout.

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13	Relationship shown	M1	for use of Pythagoras' theorem, eg $d_A^2 = d_B^2 + d_C^2$ <b>or</b> $a^2 = b^2 + c^2$ <b>or</b> $(2x)^2 = (2y)^2 + (2z)^2$ <b>or</b> $a = \sqrt{b^2 + c^2}$  <b>or</b> uses a 3, 4, 5 triangle	May be seen at any stage Where $d_A, a, 2x$ , etc are their diameters  Could be any Pythagorean triple
		M1	for forming correct expressions for the areas of at least 2 of the 3 semicircles,  eg at least two of $\frac{1}{2}\pi\left(\frac{a}{2}\right)^2, \frac{1}{2}\pi\left(\frac{b}{2}\right)^2, \frac{1}{2}\pi\left(\frac{c}{2}\right)^2$  or at least two of $\frac{1}{2}\pi x^2, \frac{1}{2}\pi y^2, \frac{1}{2}\pi z^2$  or at least two of $\frac{1}{2}\pi\left(\frac{5}{2}\right)^2, \frac{1}{2}\pi\left(\frac{3}{2}\right)^2, \frac{1}{2}\pi\left(\frac{4}{2}\right)^2$	Where $a, b, c$ are their diameters  Where $2x, 2y, 2z$ are their diameters  Where 3, 4, 5 are their diameters
		C1	for a fully correct and convincing chain of reasoning, eg showing that eg $\frac{1}{2}\pi\left(\frac{a}{2}\right)^2 = \frac{1}{2}\pi\left(\frac{b}{2}\right)^2 + \frac{1}{2}\pi\left(\frac{c}{2}\right)^2$ can be reduced to $a^2 = b^2 + c^2$  <b>or</b> that $(2x)^2 = (2y)^2 + (2z)^2$ is the same as $\frac{1}{2}\pi x^2 = \frac{1}{2}\pi y^2 + \frac{1}{2}\pi z^2$	
14 (a)	0.9	M1	for drawing a tangent at $t = 2$	
		M1	for a complete method to find the gradient eg tangent at $t = 2$ and “2.7” ÷ “3”	Use of change in $y$ over change in $x$ Working may be seen on the diagram
		A1	for answer in the range 0.7 to 1.1	Accept answers in the form $\frac{a}{b}$ where $a$ and $b$ are integers
(b)	Statement	C1	eg distance (travelled)	If units are given they must be correct



