

Question			Answer	Marks	Part marks and guidance	
1	(a)		$\frac{11}{12}$ final answer	2	M1 for $\frac{11k}{12k}$ or $\frac{9k}{12k} \left[+ \right] \frac{2k}{12k}$	$k =$ positive integer
1	(b)		$\frac{40 \times 20}{\sqrt{100}}$ $800 \div 10 = 80$	M1 A2	A1 for 800 or 10	For M1 allow 2 correct If more than one attempt, mark the better oe allow cancelling in fraction with 10 and 40 or 20
2			840	3	M2 for 168×5 oe or M1 for $30 = 2 \times 3 \times 5$ or for at least three multiples of 168 and three multiples of 30	For M1, accept 2, 3, 5 on a diagram and condone 1 included
3	(a)		She added the terms oe $2a^3$	1 1		In all 3 parts any incorrect statement treat as choice Allow correct descriptions of what Martina should have done in each part See AG
3	(b)		She divided the powers oe x^8	1 1		See AG
3	(c)		She squared ($\frac{1}{2} \times 6 \times 5$) oe 75	1 1		See AG
4			12	3	M2 for $\frac{250 - 220}{250} [\times 100]$ oe or $\frac{220}{250} \times 100$ oe or M1 for $\frac{220}{250}$ oe or $250 - 220$	M2 implied by 0.12 or 88[%] M1 implied by 0.88 or 30

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5			5.5 oe	3	M1 for correct first step e.g. $6x - 4x - 10 = 1$ M1 for $6x - 4x = 1 + 10$ FT <i>their</i> first step or FT <i>their</i> $ax = b$ to $x = \frac{b}{a}$	isw $\frac{11}{2}$ converted to decimal Embedded answer scores M2 max If not shown, M1 implied by $\pm 2x = b$ or $ax = \pm 11$ e.g. M1 for $2x = -9$ leading to $x = -\frac{9}{2}$ oe
6			$(x + 4)(x + 5)$ -5 and -4	M2 B1	M2 for $(x + 4)$ and $(x + 5)$ or M1 for $(x + a)$ and $(x + b)$ where $ab = 20$ or $a + b = 9$ or $x(x + 4) + 5(x + 4)$ or $x(x + 5) + 4(x + 5)$ If M0 scored SC1 for $x + 4 = 0$ and $x + 5 = 0$ STRICT FT <i>their</i> factors dep on two brackets in factors. If 0 scored SC1 for answers ± 5 and ± 4	For M2 or M1 condone omission of final bracket

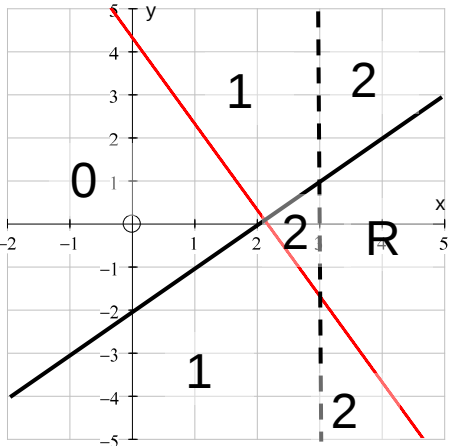
Question			Answer	Marks	Part marks and guidance	
7			2700	4	B3 for Emma's amount = 4500 or 4050 or old total = 7200 or new total = 6750 or M2 for $6k : 10k$ and $6k : 9k$ seen where k is a positive integer or for $\frac{5}{3}[-]\frac{3}{2}$ oe seen or for correct unsimplified equation to find Emma or Sundip or the total amount or M1 for $6k : 10k$ or $6k : 9k$ seen where k is a positive integer or for $\frac{5}{3}$ or $\frac{3}{2}$ or $\frac{5}{8}$ or $\frac{3}{8}$ or $\frac{3}{5}$ or $\frac{2}{3}$ oe seen or used	M2 implied by $\frac{1}{6}$ eg $\frac{3E}{5} = \frac{2}{3}(E - 450)$ where E is Emma's original share For M1 accept decimal versions of fractions
8	(a)		Rhombus	1		Allow kite, parallelogram or trapezium Do <i>not</i> allow quadrilateral or polygon
8	(b)		105	4	M1 for $DEA = 60$ or $AFB = 60$ or any angle within either equilateral triangle identified as 60 M2 for $DAE = 15$ or M1 for <i>their</i> $EAF \div 4$ soi B1FT $x = 180 - \text{their } AED - \text{their } DAE$	Angles may be identified in working or seen on the diagram May be implied by $15 : 60$ If answer incorrect then max of 3 marks
9	(a)		2500	1		Ignore units

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9	(b)		Bisector of angle BCD accurate with pairs of correct arcs	M2	B1 for accurate bisector of angle BCD with no/incorrect arcs	Tol $\pm 2^\circ$ use overlay Condone solid/broken lines bisector
			Arc centre E radius 3 cm with length fit for purpose	M2	B1 for arc centre E	Tol ± 2 mm For B1 accept 5 correctly marked points in tolerance
			No oe with correct constructions	B1	Dep on at least B1M2	Accept the boat will travel within 75 m
10			300	5	M4 for $36 \div 0.12$ oe or M1 for 0.3×0.4 oe A1 for 0.12 oe OR M1 for $36 \div 0.3$ oe A1 for 120 M1 for <i>their</i> $120 \div \frac{2}{5}$ oe seen A1FT for <i>their</i> $120 \div \frac{2}{5}$ oe correctly evaluated to nearest integer or better seen	e.g. Answer 420 from $300 + 120$, gets M1A1M1A1
11			Select a pencil from the bag and record results and put it back in the bag oe	1	eg $\frac{\text{no of red pencils}}{\text{no of trials}}$ oe or no of red pencils recorded and no of trials recorded or number of greens recorded oe	Steps may be combined together
			Repeat trial at least 10 times	1		Accept many, a lot etc clearly implied
			Find rel frequency or probability	1		} oe eg if number of trials = 20 and then number of reds $\times 5$ or no of red pencils $\times \frac{100}{\text{no of trials}}$ oe then allow both marks
			Rel freq $\times 100$ oe	1		

Question			Answer	Marks	Part marks and guidance	
12	(a)		15	2	M1 for [UQ =] 64 and [LQ =] 49	Could be on diagram
12	(b)		Correct box plot	3	B2 for 4 or 5 correct markers OR B1 for 3 correct markers or 54 or 76 soi	Use overlay, condone freehand
12	(c)		Incorrect and Interquartile range is measure of spread not average oe or Incorrect and boys were less consistent because of the IQR oe	2	B1 for no/wrong decision and boys did better on average oe as median was larger or they had higher marks overall oe or boys were less consistent [and IQR not mentioned] oe	For 2 marks e.g. Incorrect and should have said the median is greater rather than IQR
13	(a)	(i)	[0]. $\dot{3}$	1		Condone e.g. [0].3 $\dot{3}$
13		(ii)	[0].0 $\dot{3}$	1		Condone e.g. [0].03 $\dot{3}$
13	(b)		$4\sqrt{5}$	3	B2 for $\frac{20\sqrt{5}}{5}$ or M1 for $\frac{20}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ or better	

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14			3.5	3	M2 for $\frac{7 \times \sqrt{25}}{\sqrt{100}}$ oe Or M1 for $\frac{y}{7} = \frac{\sqrt{25}}{\sqrt{100}}$ oe OR M1 for $y = \frac{k}{\sqrt{x}}$ oe B1 for $k = 35$	Accept $ky = \sqrt{x}$ Accept $k = \frac{5}{7}$
15	(a)		Translation $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$ oe	2	B1 for $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$ oe or for translation $\begin{pmatrix} -4 \\ k \end{pmatrix}$ oe or translation $\begin{pmatrix} k \\ -3 \end{pmatrix}$ oe If 0 scored, SC1 for translation $(-4, -3)$ or for triangle drawn on grid at $(-1, 0)$, $(-1, -1)$, $(1, -1)$	Extra transformations spoil all marks but allow SC1 mark Extra properties treat as choice oe e.g. 4 left and 3 down Use overlay ignore other triangles
15	(b)		Reflection $x - \text{axis}$ oe	3	B2 for reflection B1 for $x - \text{axis}$ oe If 0 scored, SC2 for image drawn at $(3, -3)$, $(3, -2)$ and $(5, -2)$ SC1 for image drawn at $(3, 3)$, $(2, 3)$ and $(2, 5)$	Extra transformations spoil all marks but allow SC marks Extra properties treat as choice Use overlay ignore other triangles

Question			Answer	Marks	Part marks and guidance	
16			$\frac{11}{40}$ oe	5	B3 for walk [only] = 29, walk and sail = 11 or B2 for walk and sail = 11 or M1 for $40 + 18 + 3 - 50$ oe M1 for answer $\frac{n}{40}$ or $\frac{11}{k}$ OR M1 for $40 + 18 + 3 - 50$ oe B2FT for correctly completed Venn diagram with $40 - x$, x [<i>their</i> 11], $18 - x$, [3] correctly placed FT <i>their</i> x (can be algebraic or x is an integer ($0 < x < 18$)) or B1FT for attempt at Venn diagram with $40 - x$ or $18 - x$ or 3 correctly placed FT <i>their</i> x (can be algebraic or x is an integer ($0 < x < 18$)) M1 for answer $\frac{n}{40}$ or $\frac{11}{k}$	Accept dec or % equivalents (3 figures) 0.275 or 27.5 % isw cancelling, conversion to other forms For B3 and B2 11 must be identified for both walk and sail M1 implied by 11 seen where $0 < n < 40$ and $11 < k < 50$ Check previous working for signs of cancelling e.g. $\frac{18}{40} = \frac{9}{20}$ gets M1 M1 implied by 11 seen For B2 or B1, condone omission of universal set rectangle where $0 < n < 40$ and $11 < k < 50$ Check previous working for signs of cancelling e.g. $\frac{18}{40} = \frac{9}{20}$ gets M1

Question		Answer	Marks	Part marks and guidance	
17		$a^{\frac{4}{3}} \times a^{-1} = a^{\frac{4}{3}-1} = a^{\frac{1}{3}}$ or $a^{\frac{4}{3}} \div a = a^{\frac{4}{3}-1} = a^{\frac{1}{3}}$	3	B1 for $a^{\frac{4}{3}}$ B1 for $\left[\frac{1}{a}\right] a^{-1}$	e.g. $a^{\frac{4}{3}} \times a^{-1} = a^{1/3}$ scores B1B1 only but $a^{\frac{4}{3}} \times a^{-1} = a^{1/3}$ with $\frac{4}{3} - 1 = \frac{1}{3}$ or arrow connecting $\frac{4}{3}$ and -1 scores full marks.
18			6	B1 for $y = x - 2$ drawn B2 for $x = 3$ broken line or B1 $x = 3$ solid line AND B1 for R correct side of $3y + 6x = 13$ B1 for R correct side of <i>their</i> $y = x - 2$ B1 for R correct side of $x = 3$	Penalise one mark only for good freehand lines Additional lines treat as choice See marks on diagram for the final B3 marks provided all lines drawn correctly For region, FT <i>their</i> $y = x - 2$ provided line with positive gradient only but no FT for $x = 3$ if incorrect
19	(a)	$\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$ final answer	1		

Question			Answer	Marks	Part marks and guidance	
19	(b)		10 nfwv	6	B3 for $BD = 10\sqrt{2}$ oe or M2 for $10\sqrt{6} \times \tan 30$ oe or M1 for $\frac{BD}{10\sqrt{6}} = \tan 30$ oe AND M2 for $BC = \sqrt{\frac{\text{their } BD^2}{2}}$ oe or $\text{their } BD \times \text{their } \sin 45$ oe or M1 for $BC^2 + CD^2 = (\text{their } BD)^2$ or for $\frac{BC}{\text{their } BD} = \text{their } \sin 45$	Allow use of other variables for BC and CD (possibly different)
20	(a)		$(x - 3)^2 + 2$ final answer	3	B1 for $(x - 3)^2$ B2 FT for 2 or M1 for $11 - (\text{their } -3)^2$ If 0 scored, SC2 for final answer $(x - 3) + 2$	FT can be implied, check $11 - (\text{their } -3)^2$

Question			Answer	Marks	Part marks and guidance	
20	(b)		U shaped parabola with minimum value indicated in 1st quadrant at (3, 2)	3	FT U-shaped parabola with turning point at <i>their</i> $(-a, b)$ from part (a) dep on answer of form $(x + a)^2 - b$ where $a \neq -3$ and/or $b \neq 2$ B1 for U shape curve B1 for turning point at (3, k) or FT for turning point at $(-a, k)$ dep on answer of form $(x + a)^2 - b$ in part (a) B1 for turning point at (k, 2) or FT for turning point at (k, b) dep on answer of form $(x + a)^2 - b$ in part (a)	Be generous for the U shape condone broken line Sketch takes priority when marking Do not allow all 3 marks if (3, 2) indicated on U shaped parabola but TP on sketch is in wrong quadrant Values must be shown but could be marked on axes. Mark intention Accept turning point = (3, 2) written in working provided no contradiction on sketch If point (3, 2) only plotted on graph and no sketch then B0B1B1
21	(a)		6 (0, 0)	1 1		
21	(b)		10	4	B3 for 5 and -5 Or M2 for $x^2 = 25$ Or M1 for $x^2 + (\sqrt{11})^2 = 36$	Accept a or b for x