1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		15 ÷ 10 80 × 1.5 60 × 1.5 30 × 1.5 36 × 1.5	120, 90, 45, 54	3	M2 for any one of 80 + 40 or 60 + 30 or 30 + 15 or 36 + 18 or 120 or 90 or 45 or 54 seen A1 cao OR M1 for 15 ÷ 10 or 3 ÷ 2 or sight of 1.5 M1(dep) for 80 × '1.5' or 60 × '1.5' or 30 × '1.5' or 36 × '1.5' A1 cao OR M1 for 80 ÷ 10 or 60 ÷ 10 or 30 ÷ 10 or 36 ÷ 10 or 8 or 6 or 3 or 3.6 M1(dep) for '8' × 15 or '6' × 15 or '3' × 15 or '3.6' × 15 A1 cao OR M1 for 80 ÷ 2 or 60 ÷ 2 or 30 ÷ 2 or 36 ÷ 2 or 40 or 30 or 15 or 18 M1 (dep) for '40' × 3 or '30' × 3 or '15' × 3 or '18' × 3 A1 cao
2	(a)		Positive correlation	1	B1 for positive correlation or as the number of pages increases the time taken increases or the longer the book the more time it takes to read oe
	(b)		7.5	2	M1 for line of best fit drawn between (50, 2) and (50, 4) and (200, 9) and (200, 11) A1 for 6.5 – 8.5
3	(i)		55	1	B1 cao
	(ii)		Corresponding angles	1	B1 for corresponding (angles), accept F angles

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		$\frac{7\times20}{0.5}$	280	3	M1 for any two of 7, 20 and 0.5 seen or 140 or 40 or 14 M1 for 14 × 20 or $\frac{140}{0.5}$ or 7 × 40 or7.2 × 40 or 144 ÷ 0.5 or 140 × 2 A1 for 280 – 300
5	(a)(i)	$5 \times (-2)^2 + 2$ $= 5 \times 4 + 2$	22	1	B1 cao
	(ii)	$47 - 2 = 45$ $45 \div 5 = 9$	3	2	M1 for $\frac{47-2}{5}$ or $\frac{47+2}{5}$ A1 for 3 or -3 (accept ±3)
	(b)		–1, 0, 1, 2, 3	2	B2 cao (B1 for at least 4 correct and not more than one incorrect integer)
6		360 ÷ 30	12	2	M1 for 360 ÷ 30 A1 cao
7	(a)		Reflection	2	B2 for vertices of shape plotted at (-3, 2), (-3, 3), (-5, 3), (-6, 2.5), (-5, 2) (B1 for a reflection in any vertical or horizontal line)
	(b)		Translation; $\begin{pmatrix}-6\\-1\end{pmatrix}$	2	B1 for translation B1 (indep.) for 6 left and 1 down OR $\begin{pmatrix}-6\\-1\end{pmatrix}$ Note B0 if more than one transfomation given

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		Question + response boxes	2	B1 for an appropriate question with a specific time frame e.g. each day B1 for at least 3 non-overlapping boxes. Do not accept inequalities N.B. Do not accept frequency tables or data collection sheets
	(b)		e.g. biased (sample)	1	B1 for a correct reason, e.g. biased (sample) or more likely to exercise more oe
9	(a)		4, 7	1	B1 cao
	(b)		$4n - 3$	2	B2 cao (B1 for $4n + a$ or $n = 4n - 3$)
10		$(7 \times 2 + 2 \times 5) \times 200 = 4800$ 4800×8	38 400 g	5	M1 for 7×2 or 2×5 or 7×7 or 5×5 or 2×2 M1 for "7×2" + "2×5" oe or "7×7" – "5×5" M1 (dep on 1st M) for '24' × 200 or '0.0024' × 2 M1 for '4800' × 8 or '0.0048' × 8 000 000 or '0.0048' × 8000 A1 for 38 400g or 38.4kg SC B3 for any answer including digits 384

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
11		P: T: B = 1 : 3 : 6 54 ÷ 10 × 6 or T = 3P and B = 2T oe So, B = 2 × (3P) = 6P P + T + B = P + 3P + 6P = 10P P = 54 ÷ 10 = £5.40 B = 6 × £5.40	32.40	3	M1 for 1 : 3 : 6 or any three numbers, in any order, in the ratio 1 : 3 : 6 M1 for 54 ÷ (1 + 3 + 6) × 6) A1 for 32.4(0) Or M1 for 1: 3: 6 oe or P + 3P + 6P (=10P) oe e.g T/3 + T + 2T (=10T/3) or e.g B/6 + B/2 + B (=10B/6) or 5.4(0) or 16.2(0) seen M1 for 54 ÷ 10 × 6 or [54 ÷ "$\frac{10}{3}$"] × 2 or 54 ÷ "$\frac{10}{6}$" oe A1 for 32.4(0) Alternative M1 for a partial decomposition of £54 in ratio 1 : 3: 6, e.g. (£)5 + (£)15 + (£)30 (=(£)50) M1 for a decomposition of the remaining amount, e.g. 40(p) + 120(p) + 240(p) (= 400(p)) A1 for 32.4(0)

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)(i)	w^{6+4}	w^{10}	2	B1 accept w^{6+4}
	(ii)	h^{8-3}	h^5		B1 accept h^{8-3}
	(b)	$(12 \div 3)(x \div x^2)(y^3 \div y^3)$	$\frac{4}{x}$	2	B2 for $\frac{4}{x}$ or $4x^{-1}$ (B1 for any one from: $12 \div 3$ in numerator OR x^{1-2} in numerator or x^{2-1} in denominator OR y^{3-3} in numerator OR y^3 cancelled in both numerator and denominator
13			Points plotted at (2,10), (6,17), (10,28), (14,25), (18,20) and joined with line segments	2	B2 for correct plotting of 5 points (± 1/2 sq) and joining with line segments (B1 for points plotted correctly at midpoints of intervals OR joining points with line segments at the correct heights and consistent within the class interval (including end values) OR correct frequency polygon with one point incorrect OR correct frequency polygon with first and last point joined) NB Ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
14			Construction	3	M1 for arcs construction of 60 degrees M1 (dep) for arcs bisector of '60 degrees' (not 90 degrees) A1 (dep on both M marks) for 30 degrees within guidelines OR M1 for arc construction of 90 degrees M1(dep) for arc construction of 60 degrees A1 (dep on both M marks) for 30 degrees within guidelines
15	(a)		$x^2 + 2x$	2	M1 for $x \times x + x \times 2$ or two terms including $x \times x = (x^2)$ or $x \times 2 = (2x)$ A1 for $x^2 + 2x$
	(b)	$x^2 + 3x - 4x - 12$	$x^2 - x - 12$	2	M1 for all 4 terms correct ignoring signs or 3 out of 4 terms correct from x^2 , $3x$, $-4x$, -12 A1 for $x^2 - x - 12$ (accept $x^2 - 1x - 12$)
	(c)		$2y(y - 2)$	2	B2 cao (B1 for $y(2y - 4)$ or $2(y^2 - 2y)$ or $2y(y - ...)$) or $(2y + 0)(y - 2)$ or $2y(y + 2)$
	(d)		$(x - 3)(x + 3)$	1	B1 oe

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)	$\frac{2}{3} \times \frac{6}{5}$	$\frac{4}{5}$	3	M1 for $\frac{2}{3} \times \frac{6}{5}$ M1 for $\frac{2\times6}{3\times5}$ or 12/15 oe A1 cao
	(b)	$(2-1) + \frac{5}{15} - \frac{6}{15}$ or $\frac{35}{15} - \frac{21}{15}$ Or $\begin{array}{\|c\|c\|c\|}\hline & 1 & 3 \\ \hline 2 & & 6 \\ \hline 5 & 5 & 15 \\ \hline \end{array}$ $\begin{array}{\|c\|c\|c\|}\hline & 7 & 3 \\ \hline 7 & & 21 \\ \hline 5 & 35 & 15 \\ \hline \end{array}$	$\frac{14}{15}$	3	M1 for attempt to find a common denominator or sight of $\frac{5}{15}$ or $\frac{6}{15}$ or $\frac{35}{15}$ or $\frac{21}{15}$ oe or fully correct table A1 for sight of $\frac{5}{15} - \frac{6}{15}$ or $\frac{35}{15} - \frac{21}{15}$ oe A1 for $\frac{14}{15}$ oe Alternative M1 for 0.33(3…) or 0.4 OR 2.33(3…) or 1.4 A1 for 0.33(3…) – 0.4 OR 2.33(3…) –1.4 A1 for 0.93(recurring)
17		$PBC = 90 - PAC$ $BCP = 90 - (90 - PAC)$	Proof	3	M1 for $PBC = 90 - PAC$ or $PAC = 90 - PBC$ or $ACP = 90 - PCB$ M1 for $BCP = 90 - (90 - PAC)$ or $PAC = 90 - (90 - BCP)$ oe A1 for $PAC = PCB$ and $PCA = PBC$ and $APC = CPB$ B1 SC if M0 awarded for $APC = BPC = 90^o$ or statement matching the 3 equal sets of angles $PAC = PCB$ and $PCA = PBC$ and $APC = CPB$

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
18	(a)		$90 < m \leq 100$	1	B1 cao
	(b)		(4), 16, 50, 82, 108, 120	1	B1 cao
	(c)		Cumulative frequency graph	2	B2 ft for "all 6 points" plotted and drawn correctly as a cf graph (B1 ft for 5 or 6 points plotted correctly (± 0.5 sq) at the end of intervals dep on sensible table (condone one addition error) SC B1 if 5 or 6 points plotted not at ends but consistent within each interval and joined.
	(d)		103	1	B1 for 101 – 105 otherwise ft their cf graph
19		$4x + y = 10$ $4x - 6y = 38$ – $7y = -28$, $y = -4$ $4x - 4 = 10$, $x = 3.5$ **or** $12x + 3y = 30$ $2x - 3y = 19$ + $14x = 49$, $x = 3.5$ $7 - 3y = 19$, $y = -4$ **Alternative** $y = 10 - 4x$ $2x - 3(10 - 4x) = 19$ $14x - 30 = 19$; $x = 3.5$ $4 \times 35 + y = 10$; $y = 4$	$x = 3.5$ $y = -4$	3	M1 for full method to eliminate x or y, allow one error in calculation M1(dep) for substitution of one variable into one of the equations, or by appropriate method after starting again A1 3.5 and –4 **Alternative** M1 for full method to rearrange and substitute to eliminate x or y, allow one error in calculation M1 (dep) for substitution of one variable into one of the equations, or by appropriate method after starting again A1 for 3.5 and –4

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
20			Two correct comparisons	2	B1 for Median for boys = median for girls oe OR boys highest score > girls highest score oe or boys lowest score < girls lowest score oe or lower quartile for boys < lower quartile for girls oe or upper quartile for boys = upper quartile for girls B1 for IQR boys > IQR girls oe OR range boys > range girls oe
21	(a)	e.g. $-\frac{2}{4}$	$-\frac{1}{2}$	2	M1 for attempt to find $\frac{\text{(difference in } y\text{)}}{\text{(difference in } x\text{)}}$ A1 for $-\frac{1}{2}$ oe SC B1 for $\frac{1}{2}$ or –2 seen with or without working or sight of $y = -½\,x + 2$ or $y = -½\,x$ or $-½\,x$
	(b)	$2 = -½ \times 6 + c$ $2 + 3 = c$ **Alternative** $y - 2 =$ "$-½$" $(x - 6)$ $y - 2 = -½\,x + 3$	$y = -\frac{1}{2}x + 5$	2	M1 for $y = '-\frac{1}{2}'x + c$ or $y = mx + 5$ A1 cao SC B1 for $-½\,x + 5$

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22	(a)	$27^{\frac{1}{3}} = 3$ $3^{-2} = \frac{1}{3^2}$	$\frac{1}{9}$	2	M1 for a correct cube root, reciprocal or square A1 for $\frac{1}{9}$ or 0.11(1…)
	(b)	$\frac{8-\sqrt{18}}{\sqrt{2}} = \frac{8}{\sqrt{2}} - \frac{\sqrt{18}}{\sqrt{2}}$ $= \frac{8}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} - \sqrt{\frac{18}{2}}$ $\frac{8\sqrt{2}}{2} - 3$	a = −3 b = 4	3	M1 for attempt to rationalise denominator, e.g. $\frac{8}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} - \frac{\sqrt{18}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ or $\frac{8-\sqrt{18}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ Or $8 - \sqrt{18} = \sqrt{2}(a + b\sqrt{2})$ oe A2 for $-3 + 4\sqrt{2}$ (A1 for −3) (A1 for 4) SC B1 if M0 scored for –3 or 4 seen on either answer line
23		$t(k-2) = k$ $tk - 2t = k$ $tk - k = 2t$ $k(t-1) = 2t$	$k = \frac{2t}{t-1}$	4	M1 for attempt to multiply LHS by (k– 2) or sight of $t(k-2)$ or $tk - 2t$ or $tk - 2$ (ignore RHS) M1 for attempt to subtract k from LHS or sight of $tk - k$ (ignore RHS) or attempt to subtract tk to give $-2t = k - tk$ (ignore LHS) M1 for attempt to factorise for k e.g. $k(t-1)$ or $k(1-t)$ A1 for $\frac{2t}{t-1}$ or $\frac{-2t}{1-t}$ oe
24	(a)		84, 60	2	B1 for 84 B1 for 60
	(b)			2	B1 for bar with width 160-180 and height 2cm (± 1 mm) B1 for bar with width 180-210 and height 6mm (± 1 mm)

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
25		$\pi x l = 2\pi x^2$ $h^2 + x^2 = 4x^2$ $h^2 = 3x^2$ **Alternative** $\pi x\sqrt{h^2 + x^2} = 2\pi x^2$ $\sqrt{h^2 + x^2} = 2x$ $h^2 + x^2 = 4x^2$ $h^2 = 3x^2$	$\sqrt{3}x$	4	B1 for curved surface area of one of the shapes e.g. $\pi x l$ or $2\pi x^2$ M1 for for attempt to equate surface areas e.g $\pi x l = 2\pi x^2$ or $l = 2x$ M1 for attempt to connect h and x using Pythagoras's theorem e.g. $h^2 + x^2 = 4x^2$ A1 for $\sqrt{3}x$ or $\sqrt{3x^2}$ **Alternative** B1 for $h^2 + x^2 = l^2$ oe M1 for attempt to equate surface areas e.g. $\pi x\sqrt{h^2 + x^2} = 2\pi x^2$ oe M1 (dep) for attempt to square both sides of their formula e.g. $h^2 + x^2 = 4x^2$ A1 for $\sqrt{3}x$ or $\sqrt{3x^2}$ SC B1 for attempt to equate surface areas in terms of r, rather than x
26	(a)	$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$	$-2\mathbf{a} + 3\mathbf{b}$	1	B1 for $-2\mathbf{a} + 3\mathbf{b}$ or $3\mathbf{b} - 2\mathbf{a}$
	(b)	$\overrightarrow{OP} = 2\mathbf{a} + \frac{2}{5}(3\mathbf{b} - 2\mathbf{a})$ $= \frac{6}{5}\mathbf{a} + \frac{6}{5}\mathbf{b}$ $= \frac{6}{5}(\mathbf{a} + \mathbf{b})$ parallel	$\frac{6}{5}(\mathbf{a} + \mathbf{b})$ is parallel to $\mathbf{a} + \mathbf{b}$	3	M1 for $2\mathbf{a} \pm \frac{2}{5}$('$3\mathbf{b} - 2\mathbf{a}$') OR $3\mathbf{b} \pm \frac{3}{5}$ ('$2\mathbf{a} - 3\mathbf{b}$') A1 for $\frac{6}{5}\mathbf{a} + \frac{6}{5}\mathbf{b}$ oe A1 for $\frac{6}{5}(\mathbf{a} + \mathbf{b})$ is parallel to $\mathbf{a} + \mathbf{b}$ oe

1380_3H					
Question		**Working**	**Answer**	**Mark**	**Notes**
27		$\frac{x\times 2(x+1)}{2}-\frac{2\times 2(x+1)}{x+1}=1\times 2(x+1)$ $x(x+1)-4=2(x+1)$ $x^2+x-4=2x+2$ $x^2-x-6=0$ $(x-3)(x+2)=0$	$x = 3, -2$	4	M1 for an attempt to multiply one term of the equation by 2 or $x + 1$ or $2(x+1)$ or $2\times x + 1$ with or without cancelling or attempt to write LHS with a common denominator M1 for attempt to multiply all terms by $2(x + 1)$ with or without cancelling e.g. $\frac{x\times 2(x+1)}{2}-\frac{2\times 2(x+1)}{x+1}=1\times 2(x+1)$ Or $x(x + 1) – 4 = 2(x + 1)$ A1 for $x^2 + x – 4 = 2x + 2$ or $x^2 – x – 6 = 0$ A1 cao for 3 and – 2