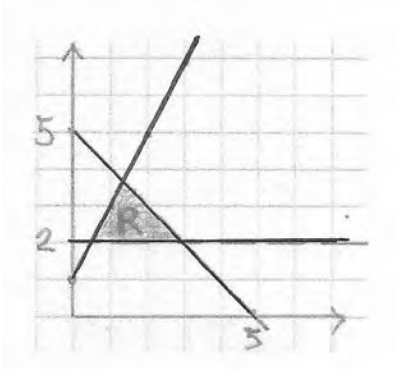
Question	Working	Answer	Mark	Notes	Sub-Total	Total
1	$\frac{23}{8}\times\frac{8}{5}$		M1	Need to see $\frac{23}{8}\times\frac{8}{5}$ and $\frac{23}{5}$ or $\frac{184}{40}$		
		$4\frac{3}{5}$	A1	**NB** no marks for an answer without any working. Must be the mixed fraction in its simplest form		2
2	$360\div12$ or $180(n-2)=168n$ oe		M1	$360\div(180-168)$ **NB** $180(n-2)=168$ is M0		
		30	A1			2
3	$(1.7\times10^{7})\div(1.5\times10^{3})$		M1	for $1.1\dot{(3)}\times10^{n}$ **or** correct value to 2 or more significant figures. Eg11333.33... 11000, 11300		
		1.1×10^{4}	A1	cao 1.1×10^{4}		2
4	$-3\times7x^{-4}-5x^{4}$		M1	for one correct term (allow $-3\times7x^{-4}$)		
		$-21x^{-4}-5x^{4}$	A1	oe e.g. $-\frac{21}{x^{4}}-5x^{4}$		2
5	$\frac{12}{3-\sqrt{5}}\times\frac{3+\sqrt{5}}{3+\sqrt{5}}$ or $12=3a+3b\sqrt{5}-a\sqrt{5}-5b$ and $3a-5b=12$, $3b-a=0$ oe		M1			
	$\frac{36+12\sqrt{5}}{9-5}$ or $4b=12$ or $4a=36$	$9+3\sqrt{5}$	A1	Correct expansion/correct method for solving simultaneous equations **with** a correct answer and no errors. **NB** no marks for answer without any working.		2

Question	Working	Answer	Mark	Notes	Sub-Total	Total
6	$\angle EFG = 63°$		M1	May be marked on diagram		
	$\angle GEF = 54°$ or $\angle BEF$ or $\angle DEG = 126°$		M1	Allow $180 -$ "their $\angle FEG$" from correct work May be marked on diagram		
		126	A1			3
7	e.g. $8x + 14y = -40$ $\quad 4x - y = 4$ $(-)\underline{8x - 2y = 8}$ $\quad (-)\underline{4x + 7y = -20}$ $16y = -48$ $\quad -8y = 24$ **or** $y = 4x - 4$ and $2x + 3.5(4x - 4) = -10$		M1	First stage of method to eliminate one variable – allow one error only in multiplication or one sign error eg $4x = 4 - y$ – with intention to add or subtract as appropriate or correct substitution.		
	e.g. $4x - -3 = 4$		M1	Dep on first M1 method to find second variable or starting again.		
		$x = 0.25$ $y = -3$	A1	for both 0.25 oe and -3 dep on first M1		3
8	$0.6^3 \times 0.4 \left(= \frac{54}{625}(0.0864)\right)$		M1			
	$0.6^3 \times 0.4 \times 4$		M1	Dep on 1st M1		
		0.3456	A1	$\frac{216}{625}$ or 0.346 or 0.345 **NB** if working shown can allow 0.35		3
9	$3 - 2x = 5(2x - 3)$ or $3 - 2x = 10x - 15$		M1	or $\frac{3}{5} - \frac{2}{5}x = 2x - 3$ oe		
	$3 + 15 = 10x + 2x$ or $-2x - 10x = -15 - 3$ oe e.g. $18 = 12x$ or $2.4x = 3.6$, etc		M1	dep on first M1 for isolating x terms and numerical terms		
		1.5	A1	oe dep on at least one M1		3

Question	Working	Answer	Mark	Notes	Sub-Total	Total
10	19.45 or 19.35 or 2.35 or 2.45		B1			
	(*b* =) 19.45 – 2 × 2.35		M1	Or for $UB_1 - 2\times LB_2$ **or** $UB_1 = 2\times LB_2 + b$ where $19.4 < UB_1 \le 19.5$ & $2.3 \le LB_2 < 2.4$		
		14.75	A1			3
11	$3(x^3 + a) = 4(c - x^3)$ oe		M1			
	$3x^3 + 4x^3 = 4c - 3a$ or $3a - 4c = -4x^3 - 3x^3$		M1	Collecting *x* terms on one side and other terms on the opposite side		
		$\sqrt[3]{\frac{4c-3a}{7}}$	A1	oe. Do not ISW **NB** A0 for $\pm\sqrt[3]{\frac{4c-3a}{7}}$ $3\sqrt{\frac{4c-3a}{7}}$		3
12	$5^{3k+4} = 125$		M1	Allow $\frac{750}{6}$		
	$3k + 4 = 3$		M1	Dep first M1 Writing "125" as a power of 5 and equating powers, 0.33(0.33…)		
		$-\frac{1}{3}$	A1	cao		3
13	$\left[\frac{BE^2}{9.6^2} =\right]\left(\frac{9}{16}\right) or \left(\frac{27}{21+27}\right)$ oe		M1	For $\frac{9}{16}$ or $\frac{27}{21+27}$ **Alternate** $h = 10$, $0.5BE \times x = 27$		
	$\left[BE =\right]\sqrt{\frac{9}{16}} \times 9.6$		M1	**Alternate** $(9.6 + BE)(10 - x) = 42$		
		7.2	A1			3

Question	Working	Answer	Mark	Notes	Sub-Total	Total
14 (a)(i)	$y = 2$		B1	correct line	1	
(ii)	$x + y = 5$		B1	correct line (condone incorrect labelling)	1	
(iii)	$y = 2x + 1$		B1	correct line	1	
(b)		**R** correctly placed	B1	Do not award if lines incorrect Ignore labelling of lines	1	4
15	$\frac{1}{5}\times\left(\frac{120}{5}\times 3\right)(=14.4(0))$		M1	or (Barry:) $\frac{3}{5}\times\frac{1}{5}(=\frac{3}{25})$		
	$0.35\times\left(\frac{120}{5}\times 2\right)(=16.8(0))$		M1	or (Carlos:) $\frac{35}{100}\times\frac{2}{5}(=\frac{14}{100}=\frac{7}{50})$		
	$\frac{'14.4'+'16.8'}{120}=\frac{"31.2"}{120}$		M1	Dep on M2 or for $'\frac{3}{25}'+'\frac{7}{50}'$		
		$\frac{13}{50}$ or 0.26	A1			4

Question	Working	Answer	Mark	Notes	Sub-Total	Total
16 (a)		$6w^5y^8$	B2	B1 for 2 terms correct as part of a product. Do not ISW	2	
(b)		$3a^2c$	B2	B1 for 2 terms correct as part of a product, allow $3a^2c^1$. Do not ISW	2	4
17	$OBA = 52°$		M1	may be marked on diagram		
	$AOB = 76°$ or $BAC = 128°$		M1	may be marked on diagram must be identified as correct angles		
		14	A1			
	e.g. angle between **tangent** and **radius** = **90°** base angles/radii equal / isosceles triangle **Angle sum** of **triangle** Angle sum of **triangle** =**180** **Angle sum** of **straight line** Angle sum of **straight line** = **180**		B1	for 2 correct reasons for method used		4
18 (a)	$\begin{pmatrix}-4\\2\end{pmatrix}+\begin{pmatrix}-2\\6\end{pmatrix}$ or $\begin{pmatrix}-2\\6\end{pmatrix}-\begin{pmatrix}4\\-2\end{pmatrix}$	$\begin{pmatrix}-6\\8\end{pmatrix}$	M1 A1	oe	2	
(b)	$\sqrt{"(-6)"^2+"8"^2}$		M1ft	ft part(a). Condone missing minus.		
		10	A1ft	ft part (a)	2	4

Question	Working	Answer	Mark	Notes	Sub-Total	Total
19	$(3x+2)\times\frac{5}{3x^2-7x-6}\left[-\frac{5}{x+3}\right]$		M1	For × by reciprocal condone missing bracket round $3x + 2$		
	$(3x+2)\times\frac{5}{(3x+2)(x-3)}\left[-\frac{5}{x+3}\right]$		M1	Factorising correctly		
	$\frac{5(x+3)-5(x-3)}{(x-3)(x+3)}$		M1	Correct method for combining into a single fraction		
	$\frac{5x+15-5x+15}{(x+3)(x-3)}$					
		$\frac{30}{x^2-9}$	A1	or $\frac{30}{(x+3)(x-3)}$		4
20	$\overrightarrow{AP} = -\mathbf{a} + \frac{5}{6}(\mathbf{a} + 3\mathbf{b})$ **[=** $-\frac{1}{6}\mathbf{a} + \frac{5}{2}\mathbf{b}$**]**		M1	For correct vector for $\overrightarrow{AP}$		
	$\overrightarrow{AD} = -\mathbf{a} + n\mathbf{b}$ **or** $-\mathbf{a} + (5+n)\mathbf{b}$		M1	indep allow $\overrightarrow{OD} = \mathbf{a} + n\overrightarrow{AP}$		
	$\overrightarrow{AD} = 6(-\frac{1}{6}\mathbf{a} + \frac{5}{2}\mathbf{b})$ [=$-\mathbf{a} + 15\mathbf{b}$]		M1	or $AD = 6AP$ or $1-\frac{1}{6}n = 0$ and $\overrightarrow{OD} = 15\mathbf{b}$		
	$OB : OD = 5 : 15$	1 : 3	A1	Seeing 5 : 15 or $5\mathbf{b} : 15\mathbf{b}$ equals 1 : 3 from correct working		4

Question	Working	Answer	Mark	Notes	Sub-Total	Total
21	$\sqrt{8^2+15^2}$ (=17)		M1	Using Pythagoras correctly		
	10×9+18×9+15×9		M1	correct areas of the 3 rectangles		
	$\frac{18+10}{2}\times 15$ *or* $10\times 15+\frac{8\times 15}{2}$ [=210]		M1	Attempt at area of trapezium		
	2×"210"+10×9+18×9+15×9+"17"×9		M1	dep on previous method marks – for adding the six areas together		
		960	A1			5
22 (a)	$[T=]\frac{k}{y^2}$		M1	For $\frac{k}{y^2}$		
	$0.32=\frac{k}{5^2}$		M1	Subst 0.32 for *T* and 5 for *y*		
		$T=\frac{8}{y^2}$	A1	**NB** SCB1 for $0.32=\frac{k}{\sqrt{5}}$	3	
(b)	$200=\frac{"8"}{y^2}$		M1			
		0.2	A1	oe	2	5

Question	Working	Answer	Mark	Notes	Sub-Total	Total
23 (a)		$(x+5)^2 - 32$	B2	or for $p = 5$ and $q = -32$ B1 for $(x + 5)^2$, B1 for -32	2	
(b)	$(x + '5')^2 = '32'$		M1	ft from (a)		
	$x + '5' = \pm\sqrt{'32'}$		M1	ft		
		$-5 \pm \sqrt{32}$	A1	$-5 \pm 4\sqrt{2}$ gets A0 SCB1 for use of formula with correct answers although $-5 \pm 4\sqrt{2}$ is B0	3	5
24 (a)	$(-2)^3 - 3 \times (-2)^2 - 2a + 12 (=0)$ Or $(-2)^3 - 3 \times (-2)^2 - 2\times - 4 + 12$		M1			
	$2a = -8$ or $-2a = 8$ or $2a = -20 + 12$, $a = -4$ Or $-8 - 12 + 8 + 12 = 0$ so $a = -4$		A1	no working gains zero marks	2	
(b)	$(x + 2)(x^2 - 5x + 6)$ or $x^2(x - 3) - 4(x - 3)$		M1	Allow a sign error		
	$x^2 - 5x + 6 = (x-2)(x-3)$	$(x+2)(x-3)(x-2)$	M1 A1	For factorising any 3 term quadratic which when expanded, the result gives at least 2 of the 3 terms from their trinomial, e.g. $(x - 6)(x - 1)(=0)$ will give x^2 and +6 terms or $(x^2 - 4)(x - 3)$ Indep of previous M mark	3	5

Question	Working	Answer	Mark	Notes	Sub-Total	Total
25 (a)	$1 - (0.15+0.13+0.2+0.32)$		M1			
		0.2	A1		2	
(b)	$\frac{0.32}{0.13} \times 39$ or $0.32 \times (39 \div 0.13)$ or 0.32×300		M1	oe		
		96	A1		2	
(c)	0.15×360		M1	oe		
		54	A1		2	6
26(a)		$\begin{pmatrix} 16 & 3 \\ -4 & 11 \end{pmatrix}$	B2	-1eeoo	2	
(b)		$\begin{pmatrix} 11 & 0 \\ -3 & 10 \end{pmatrix}$	B2	-1eeoo	2	
(c)		$\begin{pmatrix} 12 & -7 \end{pmatrix}$	B1	for matrix of correct order or for 12 and -7 seen. Allow 10 + 2, -15 + 8 or $5\times2+2\times1$ and $5\times-3+2\times4$	2	
			B1	fully correct including brackets		6