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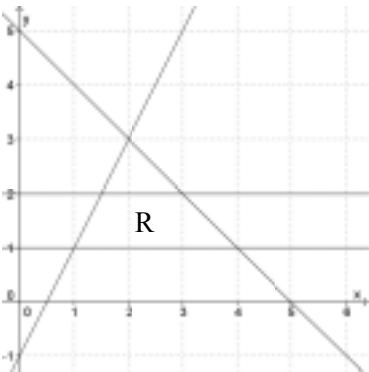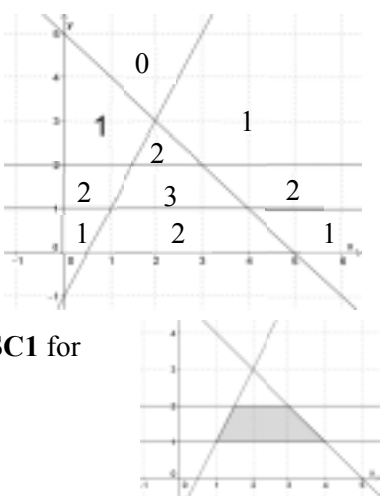
Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Marks	Part marks
1	x^{10}	**1**	
2	4	**1**	
3(a)	23.46 cao	**1**	
3(b)	20 cao	**1**	
4(a)	Chicago	**1**	
4(b)	-3	**1**	
5	$4n(3n - m)$ final answer	**2**	**B1** for $4(3n^2 - mn)$ or $n(12n - 4m)$ or $2n(6n - 2m)$ or $2(6n^2 - 2mn)$
6(a)	-4	**1**	
6(b)	$\dfrac{1}{5}$ or 0.2	**1**	
7	$2\dfrac{8}{21}$ cao	**3**	**M2** for $\dfrac{50}{21}$ or $1\dfrac{8}{21}$ or $\dfrac{29}{21}$ or $1\dfrac{29}{21}$ or **M1** for $\dfrac{14k\,(\text{or}\,35k)}{21k} + \dfrac{15k}{21k}$
8	rt $(1 - t)\,r$ $(1 - r)t$ oe $(1 - r)(1 - t)$ oe	**3**	**B1** for each
9	1.5 oe	**3**	**M1** for $h = k\sqrt{p}$ oe **M1** for $h = their\ k\sqrt{p}$ or **M2** for $\dfrac{6}{\sqrt{4}} = \dfrac{h}{\sqrt{\dfrac{1}{4}}}$ oe

Question	Answer	Marks	Part marks
10	Correct region identified	3	 **SC1** for
11	60	3	**M2** for $75 \div \sqrt[3]{\dfrac{125}{64}}$ or $75 \times \sqrt[3]{\dfrac{64}{125}}$ or **M1** for $\sqrt[3]{\dfrac{125}{64}}$ soi or $\sqrt[3]{\dfrac{64}{125}}$ soi or $\left(\dfrac{h}{75}\right)^3 = \dfrac{64}{125}$ oe
12	$k - 3$ or $-3 + k$	3	**M1** for $5 = \dfrac{23 - 8}{k - x}$ oe **M1** for $5(k - x) = 23 - 8$ or better e.g. $[x =] k - \dfrac{23 - 8}{5}$
13	3.75 or $3\dfrac{3}{4}$ or $\dfrac{15}{4}$	3	**M2** for $5 \times \dfrac{3}{4}$ or **M1** for $\dfrac{4}{3} = \dfrac{5}{BC}$ oe
14	165	3	**M2** for $\dfrac{360}{8} + \dfrac{360}{3}$ oe or **M1** for [exterior angle of octagon =] $\dfrac{360}{8}$ or [exterior angle of triangle =] $\dfrac{360}{3}$ oe
15(a)	$7\sqrt{5}$	2	**B1** for $2\sqrt{5}$ or $5\sqrt{5}$
15(b)	$14 + 4\sqrt{6}$ oe final answer	2	**B1** for 3 correct from $\left(\sqrt{2}\right)^2 + \sqrt{2} \times 2\sqrt{3} + \sqrt{2} \times 2\sqrt{3} + \left(2\sqrt{3}\right)^2$ or better

Question	Answer	Marks	Part marks
16(a)	Points plotted at (4.5, 33) and (6.5, 35)	1	
16(b)	Positive	1	
16(c)	Correct ruled line	1	
16(d)	33.5 to 37.5	1FT	**FT** from *their* line provided positive gradient
17(a)	[amplitude =] $\frac{1}{2}$ [period =] 1080	2	**B1** for each or **SC1** for answers reversed
17(b)	[$u = $] -3 [$v = $] 5	2	**M1** for $(x-2)^2 + (x-2) + 3$ or better If zero scored, **SC1** for $u = 5$ and $v = 9$
18(a)	$2\mathbf{a} + \mathbf{b}$	1	
18(b)	D	1	
18(c)	$\overrightarrow{CF}$ and $\overrightarrow{BG}$	2	**B1** for each
19	[$p = $] $\frac{100}{3}$ oe [$q = $] -50	4	**M3** for $2 \times \left\{ \left(\frac{60}{360} \times \pi \times 10^2 \right) - \left(\frac{1}{2} \times 10^2 \times \sin 60 \right) \right\}$ or **M2** for $\left[\frac{1}{2} \times \right] 10^2 \times \sin 60$ and $\left[2 \times \right] \frac{60}{360} \times \pi \times 10^2$ or **M1** for $\left[\frac{1}{2} \times \right] 10^2 \times \sin 60$ or $\left[2 \times \right] \frac{60}{360} \times \pi \times 10^2$ or $\sin 60 = \frac{\sqrt{3}}{2}$
20(a)	<table><tr><td>5</td><td>7</td><td>7</td><td>8</td><td>10</td></tr><tr><td>7</td><td>9</td><td>9</td><td>10</td><td>12</td></tr></table>	1	
20(b)	7	1	
20(c)(i)	$\frac{7}{25}$ or 0.28 or 28%	2FT	**FT** $\frac{their\,7}{25}$ **B1** for $\frac{k}{25}$ If zero scored, **SC1** for $\frac{2}{5}$ or $\frac{6}{15}$ if no values in the bottom two rows of the table
20(c)(ii)	0	1FT	**FT** $\frac{their\,0}{25}$

Question	Answer	Marks	Part marks
21(a)	[$u =$] 35	**1**	
	[$v =$] 110	**2**	**B1** for ACB or $ADB = 35$
21(b)	75	**2**	**B1** for 150 or **M1** for $\dfrac{360 - 210}{2}$
22(a)	$\dfrac{x}{x+3}$ final answer	**3**	**B1** for $x(x - 3)$ **B1** for $(x - 3)(x + 3)$
22(b)	$\dfrac{8x + 7}{(x - 4)(2x + 5)}$ final answer	**3**	**B1** for common denominator of $(x - 4)(2x + 5)$ **M1** for $3(2x + 5) + 2(x - 4)$ oe with an attempt to expand the brackets