Question	Answer	Marks	Guidance
1	$p^0q^{-5}r^{-\frac{2}{3}}$	**3**	**B1** for $a=0$ **B1** for $b=-5$ **B1** for $c=-\frac{2}{3}$
2(a)		**2**	**B1** for symmetrical V shape in the correct quadrant, touching the x-axis. Must have straight lines. **B1** for $x=\frac{4}{3}$ and $y=4$ only, either seen or stated on a modulus graph.
2(b)	$x\leqslant -1,\ x\geqslant\frac{11}{3}$ or 3.67 or better	**3**	**B1** for –1 from a correct method. **B1** for $\frac{11}{3}$ or 3.67 or better, from a correct method.
3(a)	$\overrightarrow{AC}=\mathbf{c}-\mathbf{a}$	**B1**	May be implied
	$\overrightarrow{OP}=\mathbf{a}+\frac{3}{5}\overrightarrow{AC}$ or $\mathbf{c}-\frac{2}{5}\overrightarrow{AC}$	**M1**	Maybe implied, for correct use of ratio $\overrightarrow{OP}=\mathbf{a}+\frac{3}{5}\left(their\,\overrightarrow{AC}\right)$ or $\mathbf{c}-\frac{2}{5}\left(their\,\overrightarrow{AC}\right)$
	$\overrightarrow{OP}=\frac{2}{5}\mathbf{a}+\frac{3}{5}\mathbf{c}$	**A1**	Allow unsimplified
3(b)	$\overrightarrow{OP}=\frac{2}{5}\mathbf{b}$ oe	**B1**	
	$\frac{2}{5}\mathbf{b}=\frac{2}{5}\mathbf{a}+\frac{3}{5}\mathbf{c}$ $2\mathbf{b}=2\mathbf{a}+3\mathbf{c}$	**B1**	**Dep** on previous B mark for equating vectors and rearrangement to obtain **AG**
	Alternative $\mathbf{b}=\frac{2}{5}\mathbf{a}+\frac{3}{5}\mathbf{c}+\frac{3}{5}\mathbf{b}$	**(B1)**	Need a clear indication of the method used, in the form of a correct unsimplified statement.
	$2\mathbf{b}=2\mathbf{a}+3\mathbf{c}$	**(B1)**	**Dep** for simplification to obtain AG

Question	Answer	Marks	Guidance
4	$\left(\frac{dy}{dx}=\right)\ \frac{1}{2}(3x+2)^{\frac{2}{3}}\ \ (+c)$	**M1**	For $k_1(3x+2)^{\frac{2}{3}}$ where k_1 a constant.
	$4=2+c$	**M1**	**Dep** for use of 4 and $x=2$ in *their* $\frac{dy}{dx}$ to obtain c
	$\left(\frac{dy}{dx}=\right)\ \frac{1}{2}(3x+2)^{\frac{2}{3}}+2$	**A1**	May be implied by subsequent integration or by $c=2$
	$y=\frac{1}{10}(3x+2)^{\frac{5}{3}}\ \ \ (+2x+d)$	**M1**	For $k_2(3x+2)^{\frac{5}{3}}$ where k_2 is a constant.
	$6.2=\frac{1}{10}(32)+4+d$	**M1**	**Dep** on previous M1 for use of $x=2$ and $y=6.2$ in *their y*
	$y=\frac{1}{10}(3x+2)^{\frac{5}{3}}+2x-1$	**A1**	Must be an equation
5(a)	$p=16$	**2**	**B1** for $\log_a\frac{5p}{4}=\log_a 20$ oe **B1** for 16, nfww
5(b)	$\left(3\left(3^x\right)-1\right)\left(3^x+3\right)=0$	**M1**	For recognition of a correct quadratic in 3^x and attempt to factorise or use quadratic formula
	$3^x=\frac{1}{3}$ $x=-1$	**2**	**M1 dep** for a correct attempt to solve $3^x=k,\ k>0$ **A1** for one solution only, must be from a correct solution.