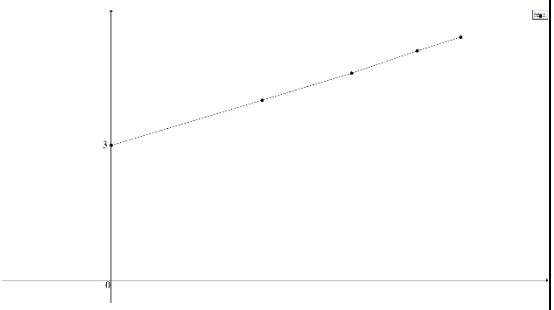
Question	Answer	Marks	Guidance
1	$a=4$	**B1**	
	$b=3$	**B1**	
	$c=-5$	**B1**	
2(a)	$c=0$	**B1**	
	$\mathrm{P}\left(-\frac{1}{2}\right)$: $a+4b=-34$ oe	**B1**	Allow multiples but must be in terms of *a*, *b* and one numeric term.
	$\mathrm{P}'(x)=3ax^2-22x+b$ $\mathrm{P}'(2)=12a-44+b$ soi	**M1**	For attempt to differentiate and substitute in $x=2$
	$12a+b=62$	**A1**	Allow multiples but must be in terms of *a*, *b* and one numeric term.
	$a=6,\ b=-10$	**2**	**M1 dep** for attempt to solve *their* simultaneous equations. **A1** for both
2(b)	$x\left(6x^2-11x-10\right)$	**M1**	For $x\left(\left(\textit{their } a\right)x^2-11x+\textit{their } b\right)$
	$x(3x+2)(2x-5)$	**A1**	
3(a)	$\pm\begin{pmatrix}-5\\12\end{pmatrix}$	**B1**	
	$\begin{pmatrix}-5\\12\end{pmatrix}$	**B1**	
3(b)	13	**B1**	**FT** on *their* (a)
3(c)	$3\left(\textit{their } \overrightarrow{AB}\right)=2\overrightarrow{OX}-2\begin{pmatrix}2\\-6\end{pmatrix}$	**M1**	Condone $3\left(\textit{their } \overrightarrow{AB}\right)=2\begin{pmatrix}2\\-6\end{pmatrix}-2\overrightarrow{OX}$
	$\begin{pmatrix}-\frac{11}{2}\\12\end{pmatrix}$	**A1**	

Question	Answer	Marks	Guidance
4(a)	$\ln y = \ln A + b\ln x$ soi	**B1**	May be implied by parts **(b)** and **(c)**
	<table><tr><td>$\ln x$</td><td>0</td><td>0.69</td><td>1.1</td><td>1.4</td><td>1.6</td></tr><tr><td>$\ln y$</td><td>3</td><td>4</td><td>4.6</td><td>5.1</td><td>5.4</td></tr></table>	**2**	**M1** for attempt to plot a correct graph, allow one point error on the graph. **A1** All points correct on the graph.
4(b)	Vertical intercept = $\ln A$ $(=3)$	**M1**	**Dep** on a straight line graph
	20	**A1**	
	Gradient = b	**M1**	**Dep** on a straight line graph
	$b = 1.5$ (allow 1.4 to 1.6)	**A1**	
4(c)	Reading off graph for $\ln x = 1.25$ to obtain $\ln y$ or use of *their* equation	**M1**	**Dep** on a straight line graph
	$120 \leqslant y \leqslant 150$	**A1**	
5(a)(i)	5040	**B1**	
5(a)(ii)	2520	**B1**	
5(a)(iii)	There are 504 codes less than 1000 $5040 - 504 = 4536$	**2**	**M1** for *their* **(i)** -504 or $9\times$(a product of 3 relevant numbers)
5(b)	With family: 462	**B1**	
	Without family: 55	**B1**	
	Total: 517	**B1**	
6(a)	$\lg 50x^3$	**3**	**B1** for $\lg x^3$ or $\lg 2$ or $\lg 100$ **B1** for $\lg \frac{x^3}{2}$