## Oxford Revise | Edexcel GCSE Maths Higher | Answers

Chapter 13 Cubic graphs, reciprocal graphs, exponential graphs, transformation of graphs

| Question | Answer | Extra information | Marks |
| :--- | :--- | :--- | :--- |
| 13.1 (a) | The inverse of $\mathrm{f}(x)$ is written as $\mathrm{f}^{-1}(x)$, but this does not <br> mean " 1 over $\mathrm{f}(x)$ ". The " -1 " superscript on the function <br> $\mathrm{f}(x)$ means the function that "undoes" $\mathrm{f}(x)$; it is not used <br> like a power or exponent. |  | 1 |
|  | $y=\frac{1-x}{2 x+4}$ <br> Swap $x$ and $y$ and then solve for $y:$ <br> $x=\frac{1-y}{2 y+4}$ <br> $2 x y+4 x=1-y$ <br> $2 x y+y=1-4 x$ <br> $y(2 x+1)=1-4 x$ <br> $y=\frac{1-4 x}{2 x+1}$ | Swap $x$ and $y$ <br> Rearrange algebraically <br> Correct answer | 1 |


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| 13.2 | $\begin{aligned} & y=a b^{x} \\ & 10=a b^{1} \\ & 0.4=a b^{-1} \end{aligned}$ <br> Divide to eliminate $a$ : $\begin{aligned} & \frac{10}{0.4}=\frac{b}{b^{-1}} \\ & 25=b^{2} \\ & b=5 \end{aligned}$ <br> Use one point and $b=5$ to find $a$ : $\begin{aligned} & 10=a \times 5^{1} \\ & a=2 \end{aligned}$ | Set up equations and eliminate $a$ Solve for $b$ Solve for $a$ | $\begin{aligned} & 1 \\ & 1 \\ & 1 \end{aligned}$ |
| 13.3 | $\begin{array}{\|l\|} \hline A=\text { Reciprocal } \\ B=\text { Cubic } \\ C=\text { Exponential } \\ D \text { is Trigonometric } \\ \hline \end{array}$ | 1 mark for two correct 2 marks for all correct | $\begin{aligned} & 1 \\ & 1 \end{aligned}$ |
| 13.4 | Exponential curve sketched passing through ( 0,1 ) <br> Correctly shown to approach but never equal 0 as $x \rightarrow-\infty$ | 1 mark for point at $(0,1)$, labelled as such 1 mark for $y=0$ asymptote <br> 1 mark for correct shape as $x$ gets large | $\begin{array}{\|l\|} \hline 1 \\ 1 \\ 1 \\ \hline \end{array}$ |
| 13.5 | $(5,10)$ | 1 mark for $x$ or $y$ correct, as long as work shows how it was calculated | $\begin{array}{\|l\|} \hline 1 \\ 1 \end{array}$ |
| 13.6 | Quadratic curve sketched that clearly shows the graph of $\mathrm{f}(x)$ being compressed in the $x$ direction. Turning point remains where $x=-4$ |  | 2 |
| 13.7 | $y=-\mathrm{f}(x)$ |  | 1 |


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| 13.8 |  | General shape correct <br> Passing through $(0,1)$ <br> Approaching, but not definitely not touching, the $x$-axis as $x$ increases | $1$ |
| 13.9 (a) | $y=x^{2}-4 x+1$ <br> Complete the square: $\begin{aligned} y & =(x-2)^{2}-4+1 \\ & =(x-2)^{2}-3 \end{aligned}$ <br> Minimum point on the curve occurs when $x=2$, which is at $(2,-3)$ | Attempting to complete the square Correct answer | $1$ |



| Question | Answer | Extra information | Marks |
| :--- | :--- | :--- | :--- |
|  | $5 x+y=10$ <br> $10 x y=-48$ <br> Rearrange second equation: <br> $y=\frac{-48}{10 x}$ <br> Substitute this in the first equation and rearrange to form a <br> quadratic: <br> $5 x+\frac{-48}{10 x}=10$ <br> $50 x^{2}-48=100 x$ <br> $50 x^{2}-100 x-48=0$ <br> $25 x^{2}-50 x-24=0$ <br> Use the quadratic formula or otherwise solve for $x:$ <br> $x=-0.4$ or $x=2.4$ <br> $y=12$ or $y=-2$ <br> Solutions are $(-0.4,12)$ and $(2.4,-2)$ | Attempt to rearrange one of the equations <br> Substitute to eliminate one variable <br> Solve the quadratic <br> Find $x$ or $y$ values <br> Find the two coordinates | 1 |
| 13.11 | The difference between 4 and 25 is $25-4=21$ <br> There are three "jumps" between 4 and 25, so each jump is <br> 21 <br> 3 <br> Thus, the sequence starts: $4,11,18,25$ <br> Continuing the sequence with the common difference of 7 <br> gives $32,39,46,53,60,67$ <br> 61 is not a term in this sequence | 1 <br> Using the 1 st and 4th terms to extract the <br> common difference. <br> Use the common difference to fill in the sequence <br> Continuing the sequence beyond 61 <br> Correct answer, demonstrated | 1 |



