Parameter changes and transformations using graphing tools

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. State the turning point and axis of $y = (x - 1)^2 - 3$. [2 marks]

The bracket is zero at $x = 1$ and the output there is -3.

Answer: $(1, -3)$; $x = 1$.

2. State the turning point of $y = (x + 4)^2 - 2$. [2 marks]

$x + 4 = 0$ when $x = -4$.

Answer: $(-4, -2)$

3. Which opens downwards: $y = 3x^2$ or $y = -x^2$? [2 marks]

The coefficient of the squared term is negative.

Answer: $y = -x^2$

4. At $x = 2$, compare the outputs of $y = x^2$ and $y = 3x^2$. [2 marks]

$2^2 = 4$ and $3(2^2) = 12$.

Answer: 4 and 12; the second is triple.

5. Write a quadratic rule with the same shape as $y = x^2$ and turning point $(3, -5)$. [3 marks]

Use a bracket zero at $x = 3$, then shift down 5.

Answer: $y = (x - 3)^2 - 5$

6. A graphing experiment changes $y = x^2 + k$ from $k = -2$ to $k = 4$. Describe what changes and what stays the same. [3 marks]

The output increases by $4 - (-2) = 6$ for every input.

Only the constant outside the square changes.

Answer: Every point moves up 6 units; shape, axis $x = 0$ and upward opening stay the same.