

## End Behavior of Polynomials

Describe the end behavior for the following functions:

$$\begin{array}{l}
 x \rightarrow -\infty \quad y \rightarrow \infty \\
 x \rightarrow \infty \quad y \rightarrow -\infty
 \end{array}
 \quad f(x) = -3x^3 + 2x^2 - 4$$

$$\begin{array}{l}
 x \rightarrow -\infty \quad y \rightarrow \infty \\
 x \rightarrow \infty \quad y \rightarrow \infty
 \end{array}
 \quad f(x) = 8x^2 - 2x + 3$$

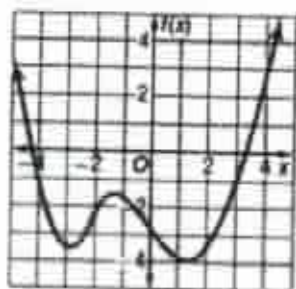
$$\begin{array}{l}
 x \rightarrow -\infty \quad y \rightarrow -\infty \\
 x \rightarrow \infty \quad y \rightarrow \infty
 \end{array}
 \quad f(x) = 7x^3 + 5x^2 + 1$$

$$\begin{array}{l}
 x \rightarrow -\infty \quad y \rightarrow -\infty \\
 x \rightarrow \infty \quad y \rightarrow -\infty
 \end{array}
 \quad f(x) = -5x^4 + 2x^2 - 4x$$

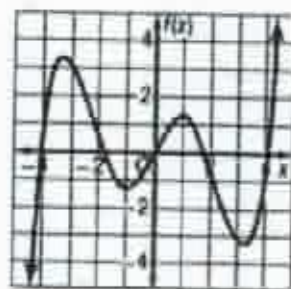
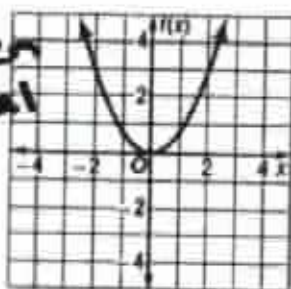
For each graph,

- describe the end behavior,
- determine whether it represents an odd-degree or an even-degree function, and
- state the number of real zeroes.

even  
2 real



even  
1 real



odd  
5 real

$$\begin{array}{l}
 x \rightarrow -\infty \quad y \rightarrow \infty \\
 x \rightarrow \infty \quad y \rightarrow \infty
 \end{array}
 \quad
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 \end{array}$$

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 x \rightarrow \infty \quad y \rightarrow \infty
 \end{array}$$

Describe any critical points (max, min, pts of inflection)

$$f(x) = 2x^3 + 4x^2 - 5x + 1$$

Rel max:  $(-1.79, 11.29)$

Rel min:  $(0.46, -1.259)$

pt of inflection  
 $x \approx -1$