

# Polynomial End Behavior Worksheet

For each polynomial function describe the end behavior using symbols.

$$\textcircled{1} f(x) = -x^2 + 4x - 3$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{2} f(x) = -x^2 + 5$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{3} f(x) = x^3 - 3x^2 + 1$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{4} f(x) = 2x^2 - 3$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{5} f(x) = x^3 - 3x^2 + 4$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{6} f(x) = 2x^5 + 8x^2 + 7x$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{7} f(x) = -11x^4 - 7x^2$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{8} f(x) = 6x^3 + 1$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{9} f(x) = x^2(x - 3)^3$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{10} f(x) = -2x^2 + 16x - 24$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{11} f(x) = -x^5 + 4x^3 - 4x + 2$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\textcircled{12} f(x) = -x^3 + 3x^2 - 4$$

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

$$\text{As } x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$$

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## Answers

①  $f(x) = -x^2 + 4x - 3$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

②  $f(x) = -x^2 + 5$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

③  $f(x) = x^3 - 3x^2 + 1$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

④  $f(x) = 2x^2 - 3$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{\infty}$

⑤  $f(x) = x^3 - 3x^2 + 4$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑥  $f(x) = 2x^5 + 8x^2 + 7x$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑦  $f(x) = -11x^4 - 7x^2$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑧  $f(x) = 6x^3 + 1$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑨  $f(x) = x^2(x - 3)^3$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑩  $f(x) = -2x^2 + 16x - 24$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{-\infty}$

⑪  $f(x) = -x^5 + 4x^3 - 4x + 2$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{\infty}$

⑫  $f(x) = -x^3 + 3x^2 - 4$

As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{-\infty}$

As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{\infty}$