

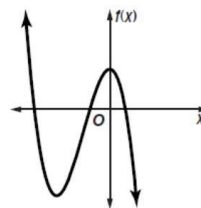
Analyzing & Sketching Polynomial Functions including Factoring

1. Which describes the end behavior of  $f(x) = -4x^2 + 1$ ?

- A) as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow +\infty$
- B) as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow +\infty$  and as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow -\infty$
- C) as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow +\infty$  and as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow +\infty$
- D) as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow -\infty$

2. State the number of real zeros for the function whose graph is shown at the right.

- A. 0
- B. 2
- C. 3
- D. 1

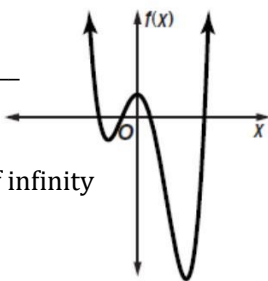


3. State the number of turning points.  
What is the degree of the function?

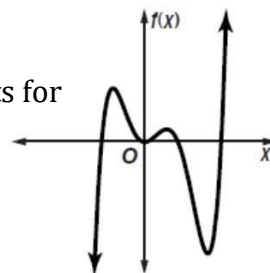
MAX of \_\_\_\_ Turning Points

Sign on LC (**a**) \_\_\_\_ Degree \_\_\_\_

Write the End Behavior in terms of infinity



4. Complete the statements for the graph provided.



Number of MAX Turning Points \_\_\_\_

Sign on LC (**a**) \_\_\_\_ Degree \_\_\_\_

as  $x \rightarrow$  \_\_\_\_\_,  $y \rightarrow$  \_\_\_\_\_

as  $x \rightarrow$  \_\_\_\_\_,  $y \rightarrow$  \_\_\_\_\_

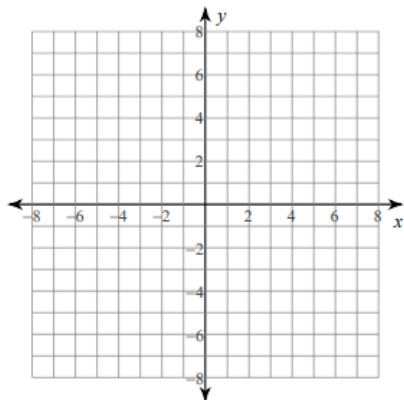
5. FACTOR the following expressions.

a)  $x^5 - 81x$

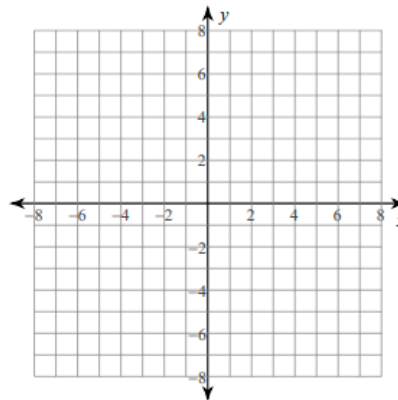
b)  $x^4 + x^3 - 4x^2 - 4x$

6. GRAPH each of the following functions with the basic shape of each graph. Show all work used to find the end behavior, the y-intercept, ALL the zeros (x-intercepts), their multiplicity and behavior at the x-axis (bounce or cross).

$f(x) = 2x^3 - 3x^2$



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



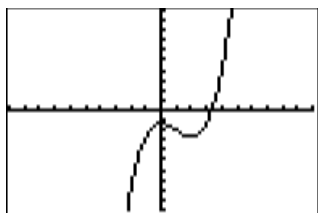
## Practice Worksheet: End Behavior & Graphing Polynomials

WITHOUT graphing, identify the end behavior of the polynomial function. (HINT: Check for Standard Form)

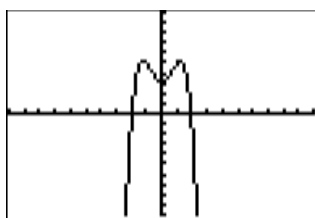
<p>7] <math>y = 2x^5 + 7x^2 + 4x</math></p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>	<p>8] <math>y = -5x</math></p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>	<p>9] <math>y = 12x^4 - 2x + 5</math></p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>
<p>10] <math>y = 6 - 2x - 4x^2 + 5x^3</math></p> <p>Standard Form:</p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>	<p>11] <math>y = 1 + 2x^6 - 4x^2 - 2x^6</math></p> <p>Standard Form:</p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>	<p>12] <math>y = 4x + 2 - 5x^6</math></p> <p>Standard Form:</p> <p>MAX # of Turning Points (curves): _____</p> <p>Sign of LC (<math>a</math>): _____ Degree: _____</p> <p>as <math>x \rightarrow -\infty, y \rightarrow</math> _____</p> <p>as <math>x \rightarrow +\infty, y \rightarrow</math> _____</p>

Match the polynomial function with its graph WITHOUT using a graphing calculator. Think about how the degree of the polynomial affects the shape of the graph.

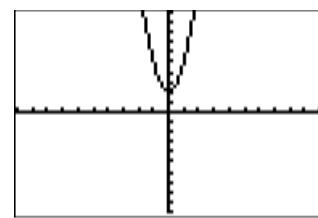
**A.**



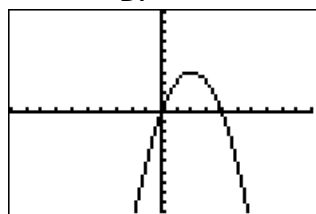
**B.**



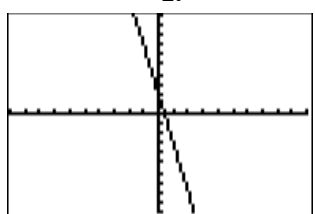
**C.**



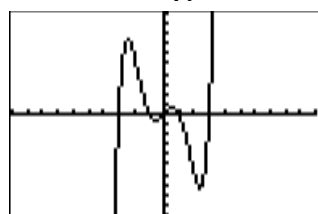
**D.**



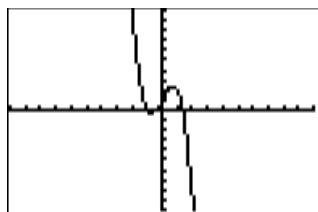
**E.**



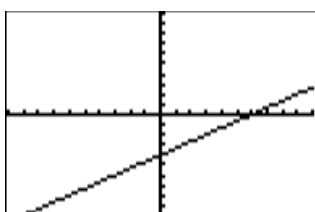
**F.**



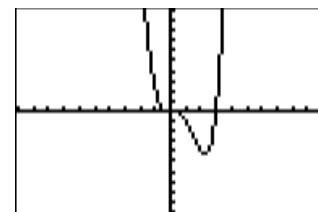
**G.**



**H.**



**I.**



\_\_\_\_ 13]  $y = -x^2 + 4x$

\_\_\_\_ 16]  $y = -2x^3 + 3x + 1$

\_\_\_\_ 19]  $y = \frac{1}{3}x^3 - x^2 - \frac{4}{3}$

\_\_\_\_ 14]  $y = -x^4 + 3x^2 + 3$

\_\_\_\_ 17]  $y = 3x^2 + 2$

\_\_\_\_ 20]  $y = \frac{2}{3}x - 4$

\_\_\_\_ 15]  $y = \frac{1}{2}x^4 - \frac{3}{2}x^3$

\_\_\_\_ 18]  $y = \frac{1}{5}x^5 - 2x^3 + \frac{9}{5}x$

\_\_\_\_ 21]  $y = -5x + 2$