

4.1

Name _____ Date _____ Period _____
2023-2024

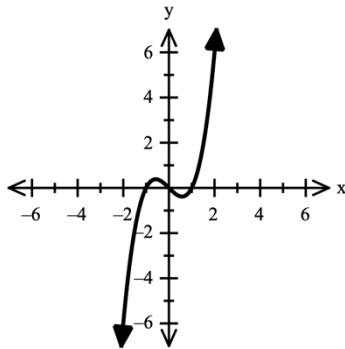
SCORE:

/

Zeros

Using the given graphs, determine the **number** of zeros for each of the following polynomials. Identify the end behavior.

1.



Zeros: _____

$$\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{1cm}} \quad \lim_{x \rightarrow \infty} f(x) = \underline{\hspace{1cm}} \quad \lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{1cm}} \quad \lim_{x \rightarrow \infty} f(x) = \underline{\hspace{1cm}} \quad \lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{1cm}} \quad \lim_{x \rightarrow \infty} f(x) = \underline{\hspace{1cm}}$$

Identify & explain how to find each of the given features.

4. $f(x) = 20x^3 - 45x$

- a) How many zeros? _____
How do you know?
How do you find them?
What are they?

- b) Explain how to find the end behavior and write them out.

End behavior: $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{1cm}}$ $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{1cm}}$

Find the zeros for each polynomial. (Hint: factor)

5. $0 = x^2 + 3x - 10$

6. $3x^2 - 7x - 6 = 0$

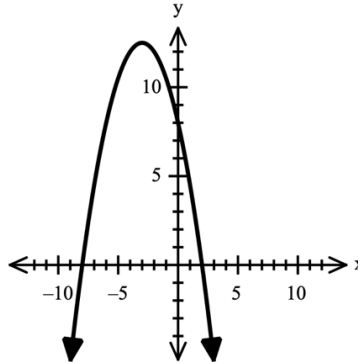
7. $x^2 - 36 = 0$

8. $f(x) = (x - 3)(x^2 + 2x - 15)$

9. $f(x) = x^3 - 49x$

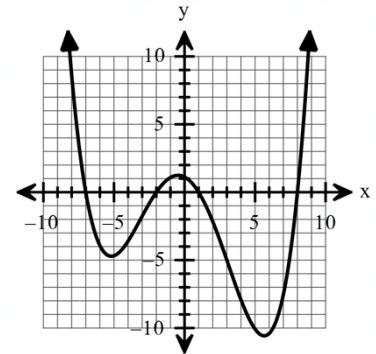
10. $f(x) = (x^2 - 4)(3x + 2)$

2.



Zeros: _____

3.



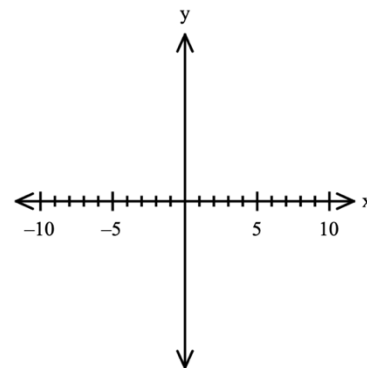
Zeros: _____

For each polynomial below, identify zeros & graph them. Determine the end behavior and graph them.

11. $f(x) = -(x - 1)^2(x + 9)$

Zeros: _____

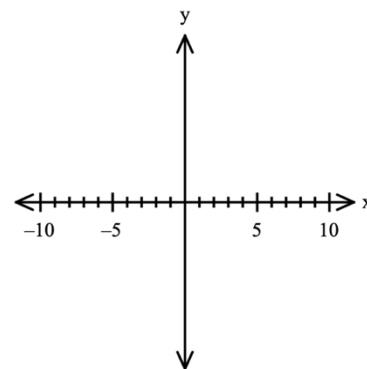
<u>End Behavior</u>	
Degree: _____ Even or Odd?	Leading Coefficient: _____ Positive or negative?
Which tells us?	
$\lim_{x \rightarrow -\infty} f(x) =$	$\lim_{x \rightarrow +\infty} f(x) =$



12. $f(x) = (x - 2)^2(x + 3)^3(x + 7)$

Zeros: _____

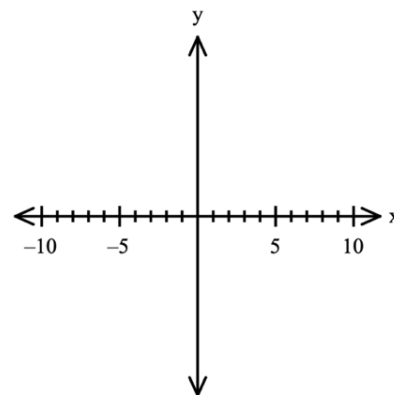
<u>End Behavior</u>	
Degree: _____ Even or Odd?	Leading Coefficient: _____ Positive or negative?
Which tells us?	
$\lim_{x \rightarrow -\infty} f(x) =$	$\lim_{x \rightarrow +\infty} f(x) =$



13. $f(x) = x^3 - 8x^2$

Zeros: _____

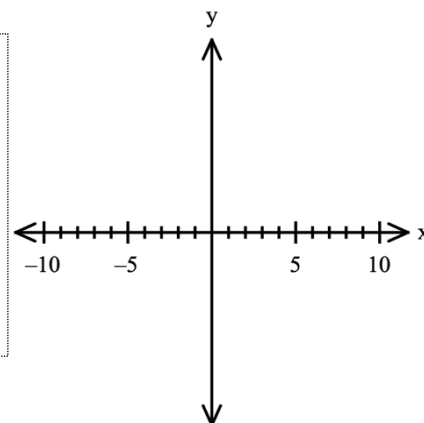
<u>End Behavior</u>	
Degree: _____ Even or Odd?	Leading Coefficient: _____ Positive or negative?
Which tells us?	
$\lim_{x \rightarrow -\infty} f(x) =$	$\lim_{x \rightarrow +\infty} f(x) =$



14. $f(x) = -4x^3 + 8x^2 + 60x$

Zeros: _____

<u>End Behavior</u>	
Degree: _____ Even or Odd?	Leading Coefficient: _____ Positive or negative?
Which tells us?	
$\lim_{x \rightarrow -\infty} f(x) =$	$\lim_{x \rightarrow +\infty} f(x) =$



For each polynomial below, identify zeros & graph them. Determine the end behavior and graph them.

Hint: Use the quadratic formula to find the zeros of each polynomial. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

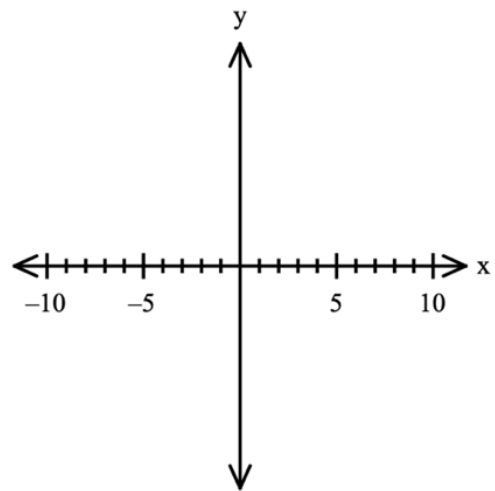
15. $f(x) = x^2 - 8x - 4$

Degree: ___

End Behavior

$\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$

$\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$



Zeros: _____

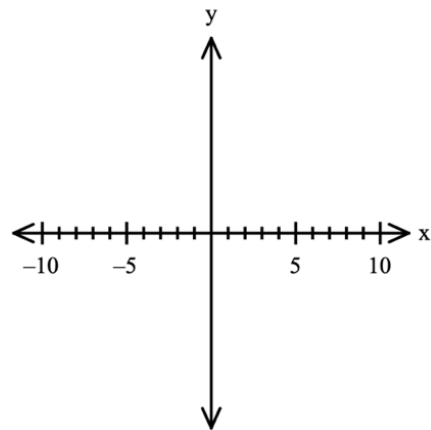
16. $f(x) = x^2 - 2$

Degree: ___

End Behavior

$\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$

$\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$



Zeros: _____

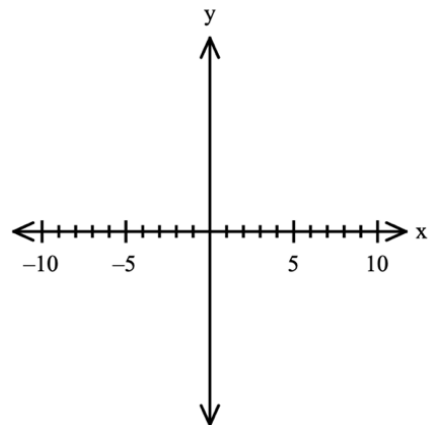
17. $f(x) = -4x^2 + 3x + 1$

Degree: ___

End Behavior

$\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$

$\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$



Zeros: _____

