Unit 4A Test Review

1. Write an equation in **factored form** for the function with the given zeros: $x = 5, -4, 1$

2. Write an equation in **standard form** for the function with the given zeros: $x = -3, 4$

For the given polynomials, determine which of the binomials listed are factors using the Remainder Theorem. Show work!

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

    a. $x + 2$

    b. $x - 2$

    c. $x + 5$

4. $f(x) = x^3 - 2x^2 - 5x + 6$

    a. $x + 2$

    b. $x - 1$

    c. $x + 9$

Find <u>how many</u> zeros each polynomial has and list the end behavior for the following:

5. $f(x) = x^8 + 16x$

    a. Number of Zeros:

    b. Left End Behavior: $\lim\limits_{x \to -\infty} f(x) =$

    c. Right End Behavior: $\lim\limits_{x \to \infty} f(x) =$

6. $f(x) = x^5 - x^2 + 8x - 13$

    a. Number of Zeros:

    b. Left End Behavior: $\lim\limits_{x \to -\infty} f(x) =$

    c. Right End Behavior: $\lim\limits_{x \to \infty} f(x) =$

7. $f(x) = -x^3 - 45$

    a. Number of Zeros:

    b. Left End Behavior: $\lim\limits_{x \to -\infty} f(x) =$

    c. Right End Behavior: $\lim\limits_{x \to \infty} f(x) =$

8. $f(x) = -x^6 - 13x + 7$

    a. Number of Zeros:

    b. Left End Behavior: $\lim\limits_{x \to -\infty} f(x) =$

    c. Right End Behavior: $\lim\limits_{x \to \infty} f(x) =$

Find the zeros of the function by factoring or using the quadratic formula.

9. $f(x) = x^2 - 49$

10. $f(x) = 5x^2 + 8x - 4$

11. $f(x) = x^2 + 13x + 36$

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

13. $f(x) = x^2 + 8x + 17$

14. $f(x) = x^2 + 16$

15. $f(x) = x^2 - 10x + 34$

List the zeros of each polynomial. State the multiplicity of each zero and determine whether the graph crosses or touches the x-axis at the corresponding x-intercept.
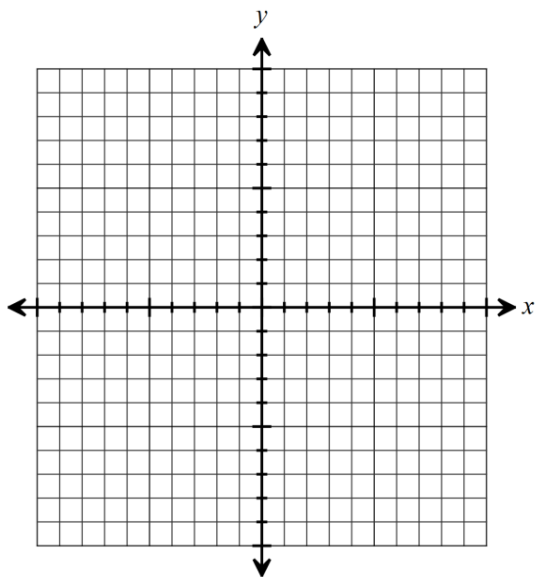
16. $f(x) = x^4(x-1)(x+8)$

Zero	Multiplicity	Touch/Cross

17. $f(x) = (x-2)^3(x+6)^3(x-10)$

Zero	Multiplicity	Touch/Cross

Without using a graphing calculator, sketch the graph each function below. Identify the zeros, multiplicity, and whether the graph touches or crosses the x-axis. Determine the end behavior.
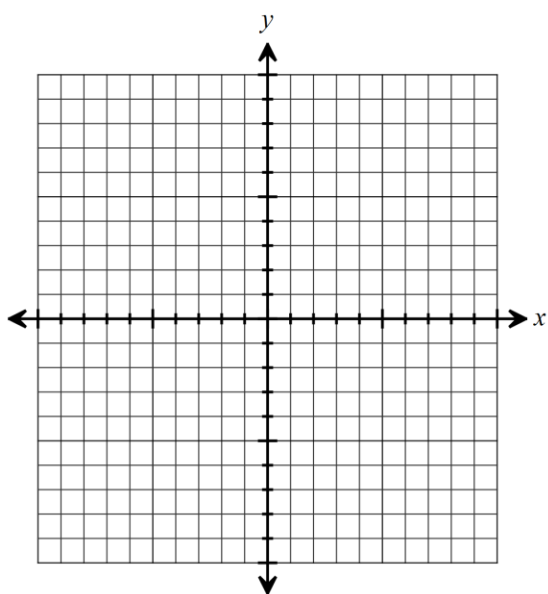
18. $f(x) = (x-4)^5(x+5)^2(x-7)$

Zero	Multiplicity	Touch/Cross

$$\lim_{x \to -\infty} f(x) =$$

$$\lim_{x \to \infty} f(x) =$$

19. $f(x) = x^3 - 64x$

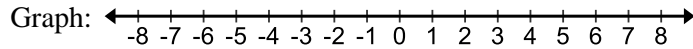| Zero	Multiplicity	Touch/Cross

$$\lim_{x \to -\infty} f(x) =$$

$$\lim_{x \to \infty} f(x) =$$

Determine the domain of each of the following functions.
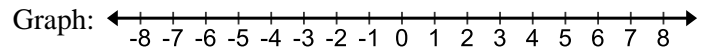
20. $f(x) = x + 5$

Interval Notation:

Set Notation:

Graph:
$$-8\ -7\ -6\ -5\ -4\ -3\ -2\ -1\ 0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8$$

21. $f(x) = -7\sqrt{-4x + 8} + 5$

Interval Notation:

Set Notation:

Graph:
$$-8\ -7\ -6\ -5\ -4\ -3\ -2\ -1\ 0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8$$

22. $f(x) = \sqrt{x + 1}$

Interval Notation:

Set Notation:

Graph:
$$-8\ -7\ -6\ -5\ -4\ -3\ -2\ -1\ 0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8$$
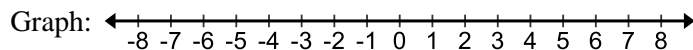
23. $f(x) = -(x + 2)^2 - 4$

Interval Notation:

Set Notation:

Graph:
$$-8\ -7\ -6\ -5\ -4\ -3\ -2\ -1\ 0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8$$
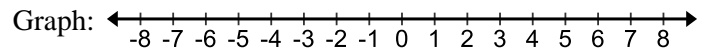
Use the following functions with their graphs to answer the following questions.

24. $f(x) = -\sqrt{x - 2} + 5$
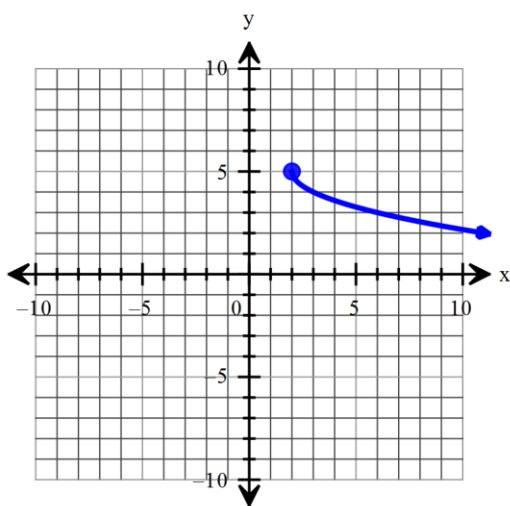
Domain:

Range:

x-intercept(s):

y-intercept:

Increasing:

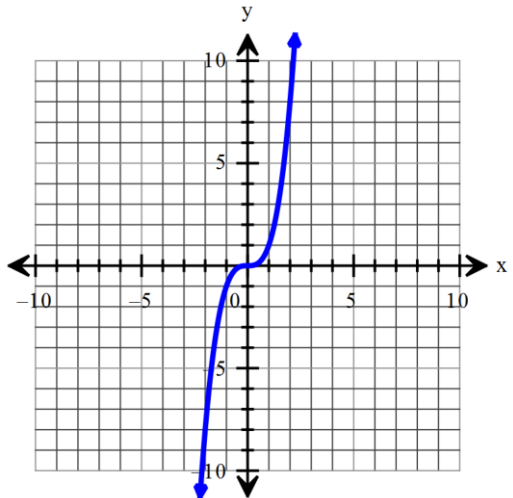Decreasing:

Constant:

Positive:

Negative:

Maximums/Minimums:

Symmetry:

End Behavior:

$\lim\limits_{x \to -\infty} f(x) =$

$\lim\limits_{x \to +\infty} f(x) =$

25. $g(x) = x^3$

Domain:

Range:

x-intercept(s):

y-intercept:

Increasing:

Decreasing:

Constant:

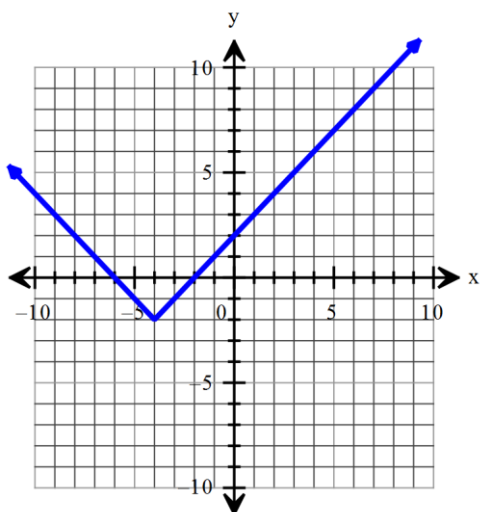Positive:

Negative:

Maximums/Minimums:

Symmetry:

End Behavior:

$$\lim_{x \to -\infty} f(x) =$$

$$\lim_{x \to +\infty} f(x) =$$

26. $h(x) = |x+4| - 2$

Domain:

Range:

x-intercept(s):

y-intercept:

Increasing:

Decreasing:

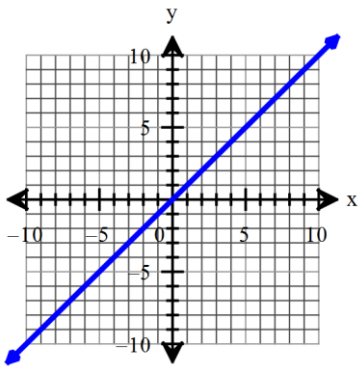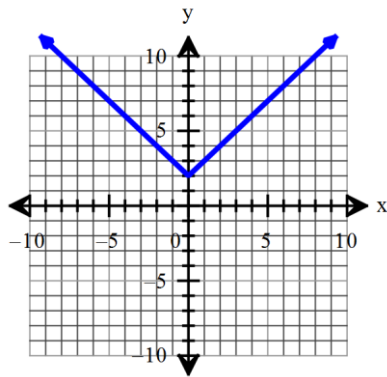Constant:

Positive:

Negative:

Maximums/Minimums:

Symmetry:

End Behavior:

$$\lim_{x \to -\infty} f(x) =$$

$$\lim_{x \to +\infty} f(x) =$$

Use the six graphs below to answer questions 6-13 Each problem may have more than one answer.
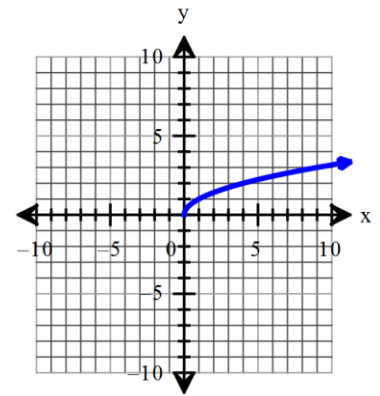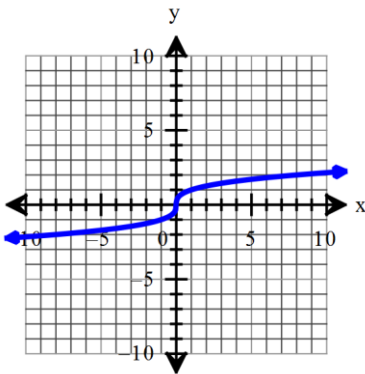
A. $f(x) = x$

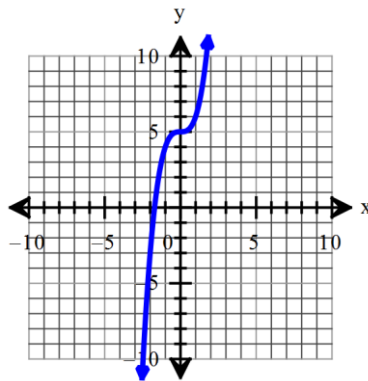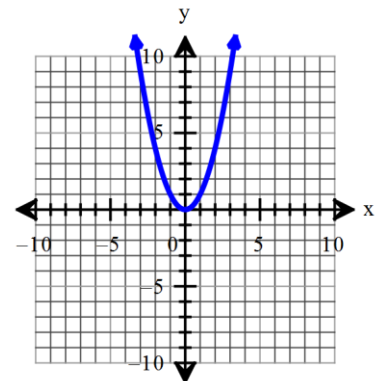
B. $f(x) = |x| + 2$

C. $f(x) = \sqrt{x}$

D. $f(x) = \sqrt[3]{x}$

E. $f(x) = x^3 + 5$

F. $f(x) = x^2$

27. Which graph(s) have no zeros?

28. Which graph(s) have a domain of $(-\infty, \infty)$?

29. Which graph(s) have a range of $[0, \infty)$?

30. Which graph(s) are increasing on part of their domain and decreasing on part of their domain?

31. Which graph(s) have a y-intercept of $(0, 0)$?

32. Which graph(s) have even symmetry?

33. Which graph(s) have odd symmetry?

34. Which graph(s) have neither even nor odd symmetry?