

Algebra 2 – Exam Review 2016

Name Key

- A 1. Let $g(x)$ be a vertical shift of $f(x) = -x$ up 3 units followed by a vertical stretch by a factor of 4. Write the rule for $g(x)$.

a. $g(x) = -4x + 12$

c. $g(x) = -\frac{1}{3}x + \frac{4}{3}$

b. $g(x) = -3x + 4$

d. $g(x) = -3x + 12$

- D 2. Add. $(-6m^3n + 7mn) + (2m^3n + 3mn - 4) + (-2mn + 8)$

a. $-6m^3n + 8mn + 10$

c. $-4m^3n + 2mn + 4$

b. $-m^3n + 5mn + 4$

d. $-4m^3n + 8mn + 4$

- B 3. Multiply. $(w + 4)(w - 4)$

a. $w^2 - 8w - 16$

c. $2w^2 - 16w$

b. $w^2 - 16$

d. $w^2 + 8w + 16$

- C 4. Multiply. $(3x + 4y)^2$

a. $9x^2 + 16y^2$

c. $9x^2 + 24xy + 16y^2$

b. $6x^2 + 8y^2$

d. $9x^2 + 12xy + 16y^2$

- A 5. Find the end behavior of the function $P(x) = 3x^5$.

a. As $x \rightarrow -\infty$, $P(x) \rightarrow -\infty$ and as $x \rightarrow +\infty$, $P(x) \rightarrow +\infty$

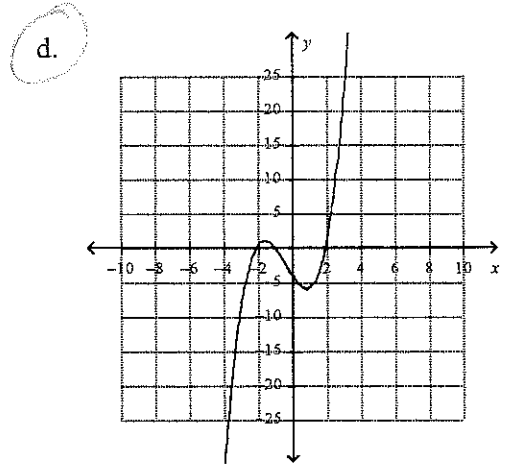
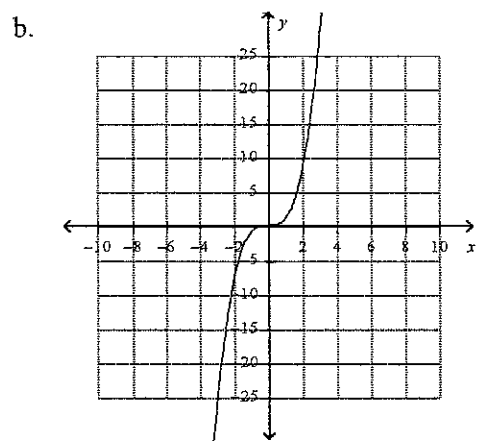
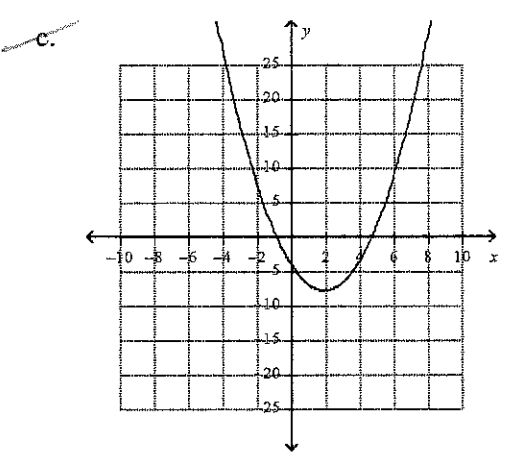
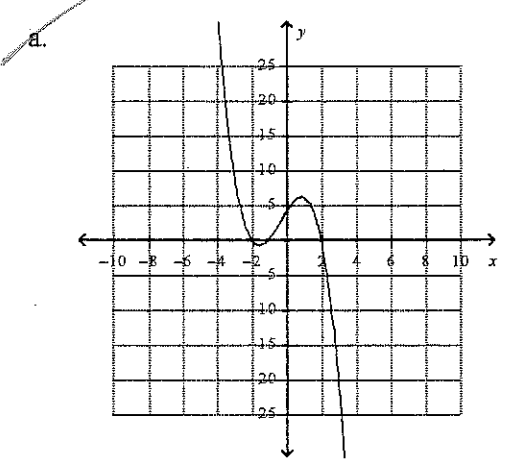
b. As $x \rightarrow -\infty$, $P(x) \rightarrow +\infty$ and as $x \rightarrow +\infty$, $P(x) \rightarrow -\infty$

c. As $x \rightarrow -\infty$, $P(x) \rightarrow +\infty$ and as $x \rightarrow +\infty$, $P(x) \rightarrow +\infty$

d. As $x \rightarrow -\infty$, $P(x) \rightarrow -\infty$ and as $x \rightarrow +\infty$, $P(x) \rightarrow -\infty$

D

6. Graph the function $f(x) = x^3 + x^2 - 4x - 4$.



A

7. Multiply $(6x + 5)(2x + 5)$.

- a. $12x^2 + 40x + 25$
- b. $12x^2 + 25$
- c. $25x^2 + 14x - 25$
- d. $12x + 25$

B

8. Subtract $(3x^2 + 2x - 3) - (x^3 + 4x + 3)$

- a. $-2x^3 - 6x + 6$
- b. $-x^3 + 3x^2 + 6x - 6$
- c. $x^3 + 3x^2 + 2x$
- d. $x^3 - 3x^2 - 6x + 6$

D

9. Which product results in $x^2 + 36$?

- a. $(x - 6)^2$
- b. $(x + 6)^2$
- c. $(x + 6)(x - 6)$
- d. None of these

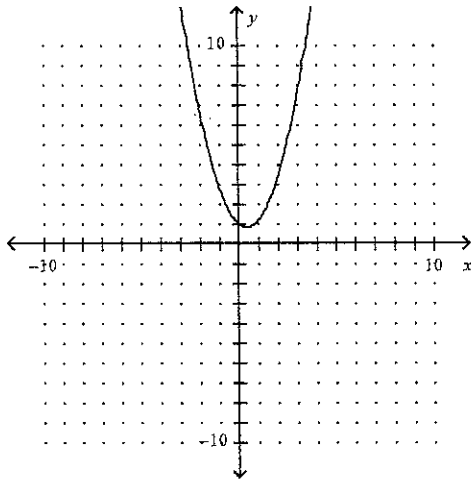
10. Suppose a rectangular garden has a length of $2p + 14$ feet and a width of $4p$ feet. Write an expression for the area of the garden in square feet.

- ~~a.~~ $10p^2 + 52p$
 b. $8p^2 + 14$

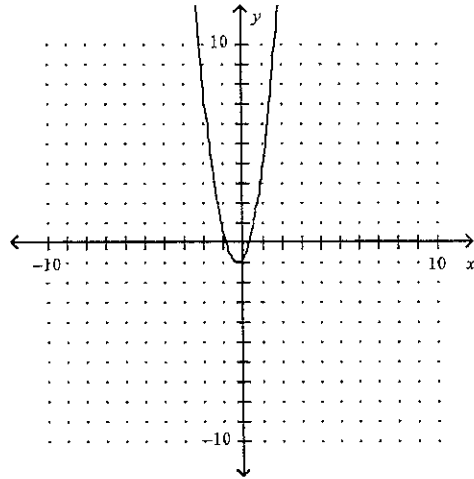
- c. $8p^2 + 56p$
~~d.~~ $8p + 56$

11. Write a polynomial function that has the zeros -3 , -1 , and 1 and has a leading coefficient of 1 . Then graph the function.

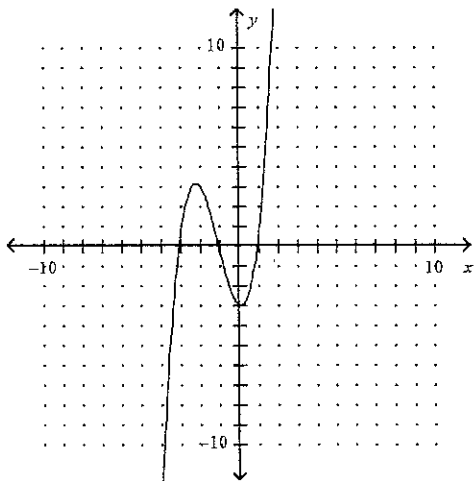
a. $f(x) = x^2 - x + 1$



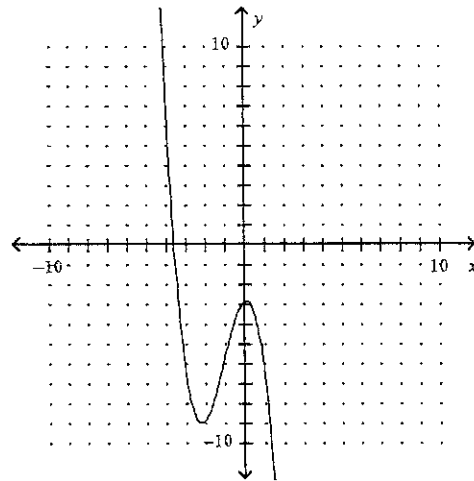
c. $f(x) = 3x^2 + x - 1$



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



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



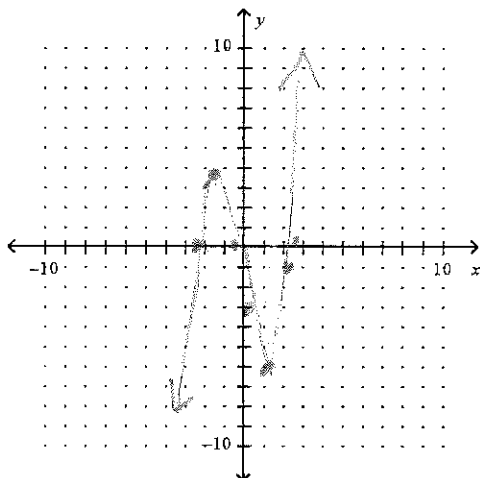
Short Answer

12. What is the transformation of the graph of $f(x) = x^3$ that yields $f(x) = 2(x+4)^3 - 1$?

V. Stretch B A F O 2
 H shift ← 4
 v. shift ↓ 1

13. Complete the table, state the zeros, maxs/mins and graph the polynomial function $h(x) = x^3 + x^2 - 5x - 3$.

x	-6	-2	0	2	6
y	-153	3	-3	-1	219



Zeros: $(-2.51, 0)$ $(-0.572, 0)$
 Max: $(-1.67, 3.48)$ $(2.09, 0)$
 Min: $(1, -6)$

Simplify.

14. $\frac{5x}{x-2} + \frac{2}{x-2}$

$$\frac{5x+2}{x-2}$$

15. $\frac{4x+3}{x^2-16} + \frac{2}{x-4} \frac{(x+4)}{(x+4)}$

$$\frac{(x-4)(x+4)}{(x-4)(x+4)} + \frac{2x+8}{(x-4)(x+4)}$$

$$\frac{6x+11}{(x-4)(x+4)}$$

16. $\frac{(x+5)4}{(x+5)} + \frac{-6x+1}{(x+5)^2}$

$$\frac{4x+20}{(x+5)^2} + \frac{-6x+1}{(x+5)^2}$$

$$\frac{-2x+21}{(x+5)^2}$$

17. $\frac{6}{5x} + \frac{7}{6x} \frac{5}{5}$

$$\frac{72}{30x} + \frac{35}{30x}$$

$$\frac{107}{30x}$$

Solve.

18. $\frac{x-4}{x-1} = \frac{10}{x+7}$

$$\begin{aligned}(x-4)(x+7) &= 10x-10 \\ x^2+3x-28 &= 10x-10 \\ -10x \quad +10 \quad -10x \quad +10 \\ x^2-7x-18 &= 0 \\ (x-9)(x+2) &= 0 \\ x=9 \quad x=-2\end{aligned}$$

19. $\frac{4}{x+1} = \frac{8}{x+6}$

$$\begin{aligned}4x+24 &= 8x+8 \\ -4x-8 & \quad -4x-8 \\ 16 &= 4x \\ \frac{16}{4} & \quad \frac{4x}{4} \\ x &= 4\end{aligned}$$

D

20. How can you obtain the graph of $g(x) = \frac{1}{x} - 2$ from the graph of $f(x) = \frac{1}{x}$?

- a. Translate the graph of f right 2 units.
- b. Translate the graph of f up 2 units.
- c. Translate the graph of f left 2 units.
- d. Translate the graph of f down 2 units.

A

21. How can you obtain the graph of $g(x) = \frac{1}{x-4}$ from the graph of $f(x) = \frac{1}{x}$?

- a. Translate the graph of f right 4 units.
- b. Translate the graph of f up 4 units.
- c. Translate the graph of f left 4 units.
- d. Translate the graph of f down 4 units.

A

22. Describe the transformation you would have to perform from the parent graph to produce the given equation,

then graph the function $y = \frac{1}{x-1} + 3$

- a. Translation right 1 unit and up 3 units.
- b. Translation down 3 units and left 1 unit.
- c. Translation down 3 units and right 1 unit.
- d. Translation left 1 unit and up 3 units.

23. Graph the following functions:

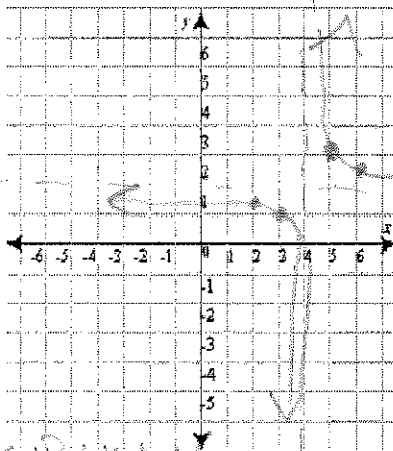
a. $g(x) = \frac{1}{x-4} + 2$

H. shift $\rightarrow 4$
 V. shift $\uparrow 2$
 $x = 4$
 $y = 2$

5	3
6	2.5
3	1
2	1.5

D: $x \in \mathbb{R}; x \neq 4$

R: $y \in \mathbb{R}; y \neq 2$



b. $g(x) = \frac{3}{x+2} - 4$

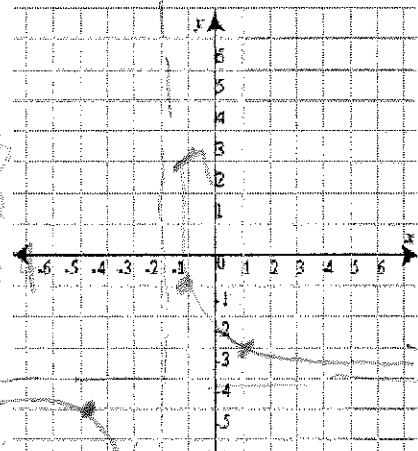
V. stretch
 BAFO3
 H. shifted
 V. shift $\downarrow 4$

$x = -2$
 $y = -4$

-1	-1
1	-3
-3	-7
-5	-10
-10	-14
-15	-17
-20	-20

D: $x \in \mathbb{R}; x \neq -2$

R: $y \in \mathbb{R}; y \neq -4$



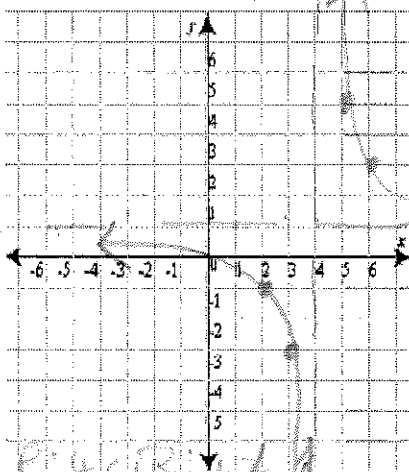
24. Graph the following functions:

a. $g(x) = \frac{x}{x-4}$

$x = 4$
 $y = 1$

5	5
6	3
3	-3
2	-1

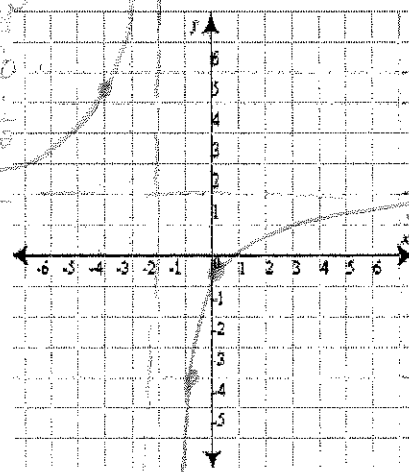
D: $x \in \mathbb{R}; x \neq 4$



b. $g(x) = \frac{3x-1}{x+2}$

$x = -2$
 $y = 2$

-1	-4
0	-1.5
-3	10
-4	5.5



25. Find the inverse of $f(x) = -2x - 5$

$x = -2y - 5$
 $x + 5 = -2y$
 $\frac{x+5}{-2} = y$

$y = \frac{-x-5}{2}$

$g(x) = \frac{-x}{2} - 2.5$

26. Find the inverse of $g(x) = \frac{1}{3}x^2$

$3x = \frac{1}{3}y^2 \Rightarrow 3$

$\sqrt{3x} = \sqrt{\frac{1}{3}y^2}$

$g(x) = \sqrt{3x}$

27. Find the inverse of $h(x) = 4x^3$

$\frac{x}{4} = \frac{1}{4}y^3$

$\sqrt[3]{\frac{x}{4}} = \sqrt[3]{\frac{1}{4}y^3}$

$h(x) = \sqrt[3]{\frac{x}{4}}$

For each equation identify the transformations, state the domain and range, and draw the graph.

28. $f(x) = 2\sqrt[3]{-x}$

29. $f(x) = \frac{1}{2}\sqrt[2]{x-3}$

30. $f(x) = -\sqrt[2]{x+1}$

Transformations:

V. stretch BAFD 2
Reflection over the y-axis

Transformations:

V. Shrink BAFD $\frac{1}{2}$
H. Shift $\rightarrow 3$

Transformations:

Reflection over x-axis
H. Shift $\leftarrow 1$

Domain: $x \in \mathbb{R}$

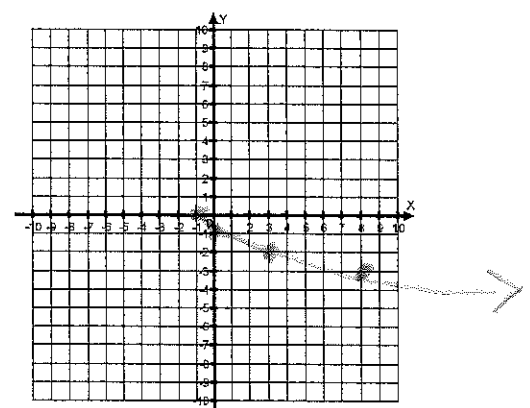
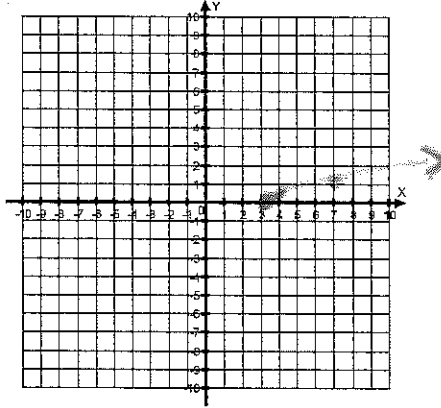
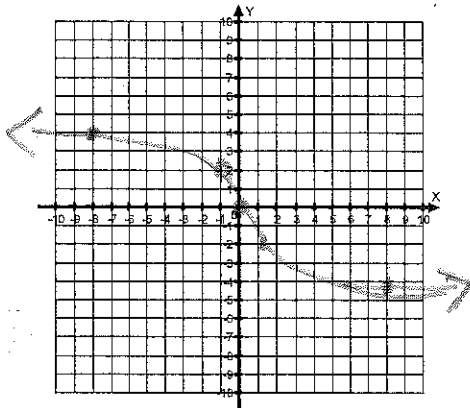
Domain: $x \in \mathbb{R}; x \geq 3$

Domain: $x \in \mathbb{R}; x \leq -1$

Range: $y \in \mathbb{R}$

Range: $y \in \mathbb{R}; y \geq 0$

Range: $y \in \mathbb{R}; y \leq 0$



Solve each equation.

Solve using Algebra. Show your Work!!

31. $(\sqrt{3x+1})^2 = 5^2$ $\sqrt{25} = 5$
 $3x+1 = 25$
 $3x = 24$
 $x = 8$

32. $2\sqrt{x} = 8$
 $\sqrt{x} = 4$
 $(\sqrt{x} - 4)^2 = 0$
 $x = 16$

$2\sqrt{16} = 8$
 $2 \cdot 4 = 8$

33. $\sqrt[3]{\frac{x}{3}} = 2$
 $3 \cdot 2^3 = x$ $x = 24$

$\sqrt[3]{24} = 2$
 $\frac{24}{8} = 3$

Solve by graphing.

34. $\sqrt[2]{3x+1} = x-1$

$x = 5$

35. $3\sqrt[3]{x+2} = x$

$x = 6$
 $x = 3$

