Algebra 2

6.1 Homework

Name: _____

1. $(7x^2 - 2x + 1) + (8x^3 + 2x^2 + 5x - 4)$

2. $(2x^2 + 3x + 1) - (7x^2 - 2x + 7x^3)$

3. $(-3x^3 - 7x^5 - 3) + (5x^2 + 3x^3 + 7x^5)$

4. $(2x^4 - 6x^2 + 8) - (x^4 + 2x^2 - 12)$

5. $\frac{1}{2}(2x^4 - 6x^2 + 8) - 3(x^4 + 2x^2 - 12)$

6. $5\left(\frac{2}{5}x^5 + \frac{3}{4}x^2 - 1\right) - \frac{1}{4}(8x^5 - x^2)$

7. For the presidential elections from 1980 to 2008, the votes cast for the Democratic candidate can be modeled by $D(x) = 0.00230x^3 - 0.0625x^2 + 1.17x + 34.9$ where x is the number of years since 1980 and $D(x)$ is the number of Democratic votes cast in millions. The votes cast for the Republican candidate in these elections can be modeled by $R(x) = -0.00140x^4 + 0.0809x^3 - 1.41x^2 + 7.29x + 43.5$ where x is the number of years since 1980 and $R(x)$ is the number of Republican votes cast in millions. Write a model for the total Democratic and Republican votes cast in the presidential elections from 1980 to 2008, and use it to estimate the total Democratic and Republican votes cast in the 2000 elections.

For #8-9, use the information below:

$f(x) = -3x + 1$, $g(x) = x^2 + 2$,   and $h(x) = x - 8$.

8. Find $f(x) \cdot g(x)$

9. Find $f(x) \cdot g(x) \cdot h(x)$

10. $-(x + 5)(3x^2 - x + 1)$

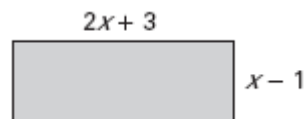11. $(x^2 + 4x - 7)(3x - 2)$

12. $(x + a)^3$

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

14. What expression must be subtracted from $(4x^2 - 6x + 2)$ to result in $(6x^2 + 2x - 3)$?

15. What expression must be added to $(-3x^2 + 5)$ to result in $(8x^2 + 3x - 6)$?

16. Write a polynomial for the volume of a rectangular prism with a height of $(2x - 1)$, a width of $(x + 6)$, and a length of $(3x + 5)$. $V = lwh$

17.   Write the area of the figure as a polynomial.

2x+ 3

x− 1

Algebra 2
6.2 Homework

Name: _____

For # 1 - 12, factor completely:

1. $x^3 + 7x^2 - 9x - 63$

2. $x^3 - 27$

3. $x^4 + 7x^2 + 6$

4. $3x^2 + 12xy - 2xy - 8y^2$

5. $2x^3 - 7x^2 - 4x$

6. $64x^3 + 125$

7. $24x^5 - 3x^2$

8. $2x^4 + 6x^3 - 8x^2 - 24x$

9. $-16x^4 - 54x$

10. $x^3 + 64$

11. $3x^3 - 3x^2y + 2xy - 2y^2$

12. $-27x^3 - 125$

For #13-18, solve each equation.

13. $x^4 - 13x^2 + 36 = 0$

14. $3x^6 = 12x^4$

15. $x^4 - 625 = 0$

16. $3m^3 - 2m^2 = 5m$ 17. $0 = x^4 - 3x^2 - 10$ 18. $x^4 - 81 = 0$

19. A local business wants to expand the size of their rectangular parking lot that currently measures $120\ ft$ by $200\ ft$. The project will cost less if equal amounts are added to each side, as shown below. Zoning restrictions limit the total size of the parking lot to $35,000\ ft^2$. What is the maximum amount of distance (x) that can be added on to the each side of the parking lot? Round your answer to the nearest foot. (Hint: use the quadratic formula to solve the polynomial.)

200 ft x

120 ft | Current Parking Lot

x
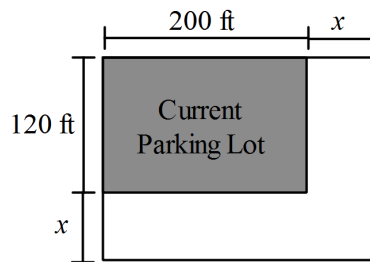
A. $1\ ft$ C. $105\ ft$

B. $31\ ft$ D. $187\ ft$
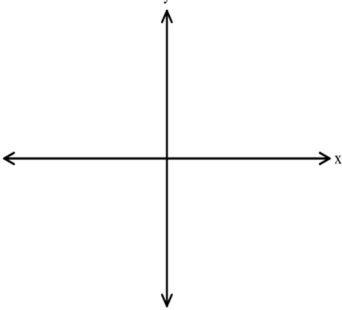
20. Graph $y = (x - 6)^2 - 1$ 21. A parabola has a vertex at (3, -4) and passes through the point (5, -2). What is the stretch or compression factor?

vertex:

solutions:

D:

R:

max/min:

Selected Answers: 1) $(x + 3)(x - 3)(x + 7)$ **6)** $(4x + 5)(16x^2 - 20x + 25)$

17) $x = \pm\sqrt{5}, \pm i\sqrt{2}$

Algebra 2   **Name**_____

Worksheet 6.5

Sketch the following polynomial functions. State the degree and end behavior. Highlight or circle (neatly) where the function is increasing.

NO graphing calculators.

1) $f(x) = 5x^3 - 2x^2 - 10x + 1$

2) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

3) $f(x) = -2x^2 + 10x + 1$

4) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

5) $f(x) = -\frac{1}{2}x^3 - 6x^2 + 1.8$

6) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

7) $f(x) = 0.235x^7 - 4.7x^4$

8) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

9) $f(x) = -43x^6 + x^3 + 1$

10) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

11) $f(x) = 5x^4 - 2x^2 - 10x + 1$

12) degree:
end behavior: $as\ x \to \infty,\quad f(x) \to$ ____ $as\ x \to -\infty, f(x) \to$ ____

For #13-16, identify where the function is increasing and decreasing and find the requested informaion.
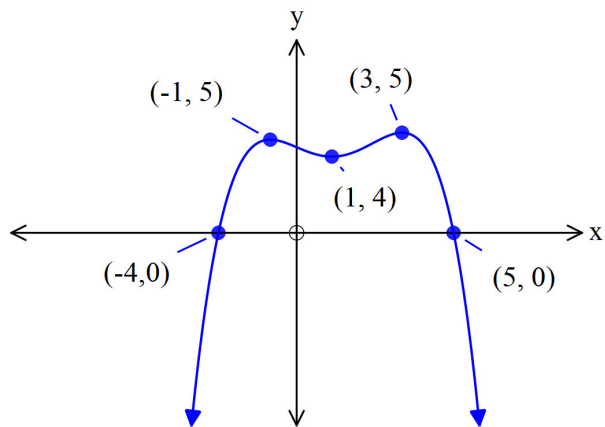
13)

(-1, 5)   (3, 5)

(1, 4)

(-4,0)   (5, 0)

Increasing:

Decreasing:

End behavior:

Where $f(x)$ is positive?

14)
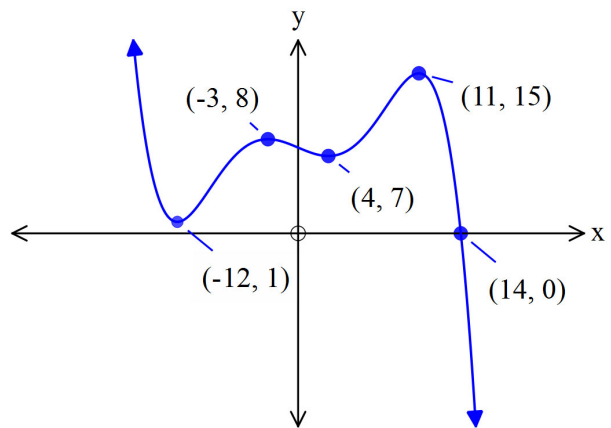
(-3, 8)   (11, 15)

(4, 7)

(-12, 1)   (14, 0)

Increasing:

Decreasing:

End behavior:

Where $f(x)$ is negative?

15)

(4, 0)

(0, -5)

$\left(2, \dfrac{-19}{3}\right)$
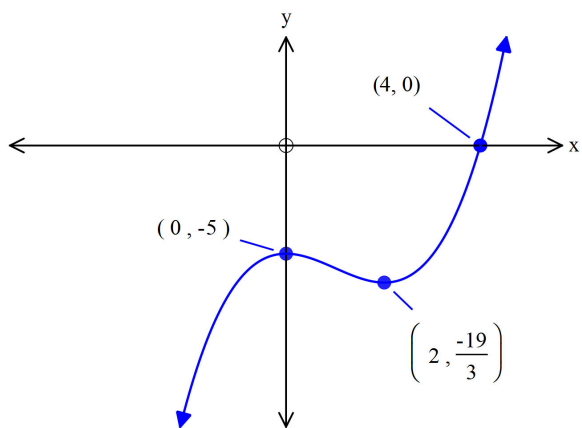
Increasing:

Decreasing:

End behavior:

Where $f(x)$ is positive?

16)

(-4.6, 0)   (1, 4)

(-0.7, 0)   (2.3, 0)

$\left(0, \dfrac{7}{3}\right)$

(-3, -6.7)
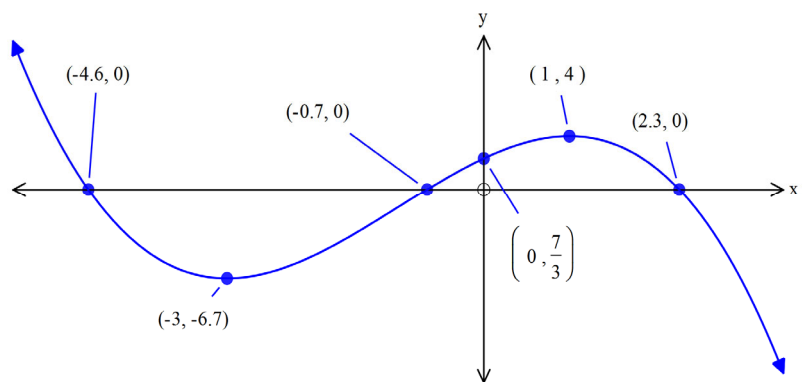
Increasing:

Decreasing:

End behavior:

Where $f(x)$ is negative?

Selected Answers: 10) deg $= 6,\ -\infty, -\infty$ 13) Inc: $(-\infty, -1), (1, 3)$ Positive: (-4, 5)
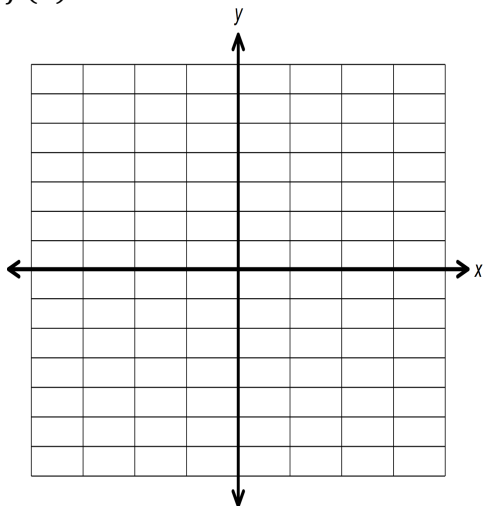
Algebra 2   Name_____

Worksheet 6.6

Graph the following polynomial functions. State the x-intercepts, relative max and min, end behavior, and where it is increasing and decreasing. ***Use graphing calculators.***

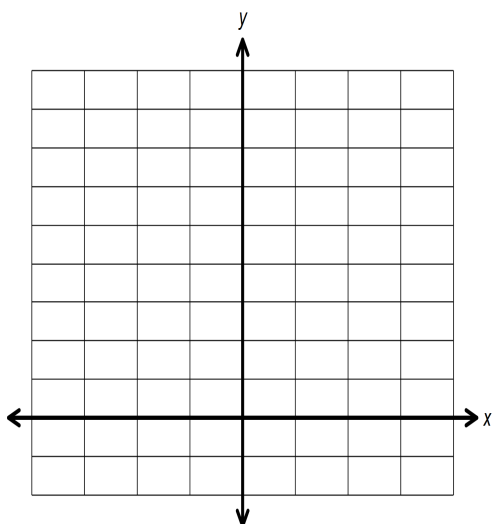1) $f(x) = 5x^3 - 2x^2 - 10x + 1$

2) x – intercepts:
Max: relative max: Min: relative min:
end behavior: $as\ x \to \infty, f(x) \to$ ___ $as\ x \to -\infty, f(x) \to$ ___
Increasing:
Decreasing:

3) $f(x) = -x^4 + 5x^2 + x + 1$

4) x – intercepts:
Max: relative max: Min: relative min:
end behavior: $as\ x \to \infty, f(x) \to$ ___ $as\ x \to -\infty, f(x) \to$ ___
Increasing:
Decreasing:
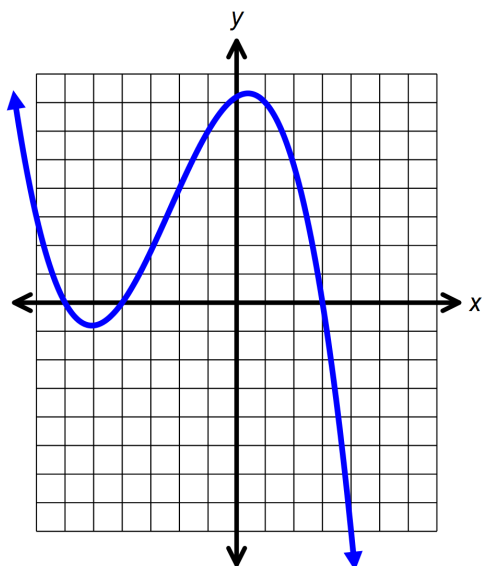
give approximate values for #5 and #6

5) x – intercepts:
Max: relative max: Min: relative min:
end behavior: $as\ x \to \infty, f(x) \to$ ___ $as\ x \to -\infty, f(x) \to$ ___
Increasing:
Decreasing:
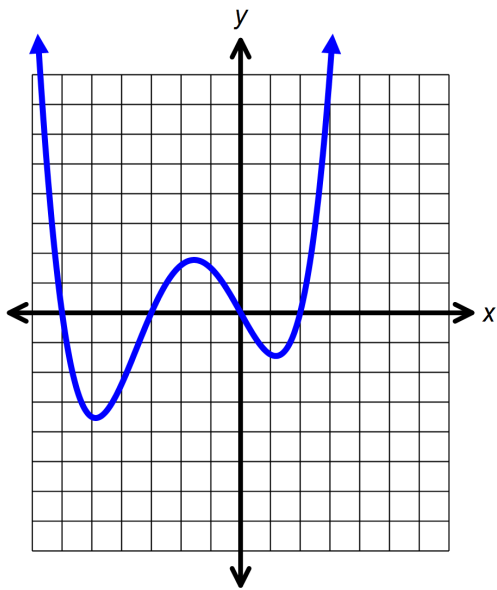
6) x – intercepts:
Max: relative max: Min: relative min:
end behavior: $as\ x \to \infty, f(x) \to$ ____ $\qquad\qquad\qquad as\ x \to -\infty, f(x) \to$ ____
Increasing:
Decreasing:

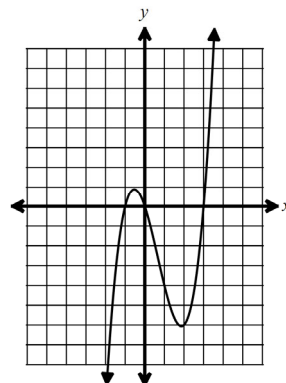**Factor:**

7. $-18x^2 + 72$

8. $3a^3 - 24$

9. $x^3 + 64$

10. $2x^3 + 16x^2 + 32x$

11. Given the function $f(x) = -(x+1)^2$, state whether the parabola opens up or down and the maximum or minimum value.

12. Given the function $f(x) = (x - 2.5)^2 + 8.6$, state whether the parabola opens up or down and the maximum or minimum value.
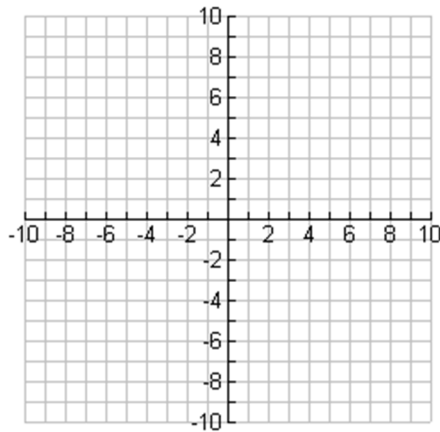
13. Which polynomial is graphed below?

   A. $f(x) = (x+1)(x-3)$

   B. $f(x) = (x-1)(x+1)(x+3)$

   C. $f(x) = x(x-3)(x+1)$

   D. $f(x) = x(x+3)(x-1)$

Selected Answers: 4) Max: (1.6, 8.8), Rel Max: (-1.5, 5.7), Min: none, Rel Min: (1, -6)   **10) $2x(x+4)^2$**

Practice Test Unit 6   Name:_____

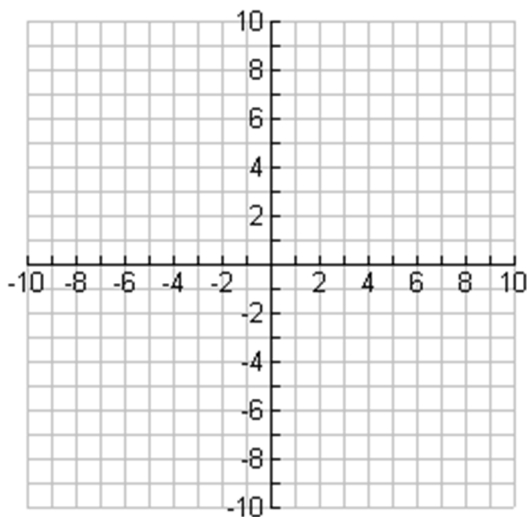3) Draw a graph of a polynomial that has x-intercepts at -5, -1, 1, and 3.

4) Describe the end behavior of the function: $y = -2x^3 - 3x^2 + 1$.

5) Describe the end behavior of the function: $y = 8x^4 - x^2 + 4$.

Graph the following polynomial functions. State the x-intercepts, relative max and min, end behavior, and where it is increasing and decreasing.

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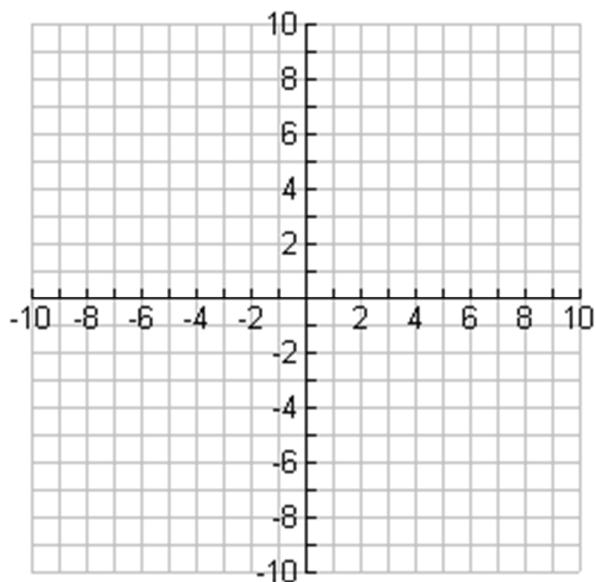

x-intercepts:

relative max:

max:

relative min:

min:

end behavior: : $as\ x \to \infty, f(x) \to$ ____
                          $as\ x \to -\infty, f(x) \to$ ____

increasing:

decreasing:

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

x-intercepts:

relative max:

max:

relative min:

min:

end behavior: : $as\ x \to \infty, f(x) \to$ ____

$\qquad as\ x \to -\infty, f(x) \to$ ____

increasing:

decreasing:

For #8 –15, perform the indicated operation:

8) $(5x^3 - x + 3) + (x^3 - 9x^2 + 4x)$

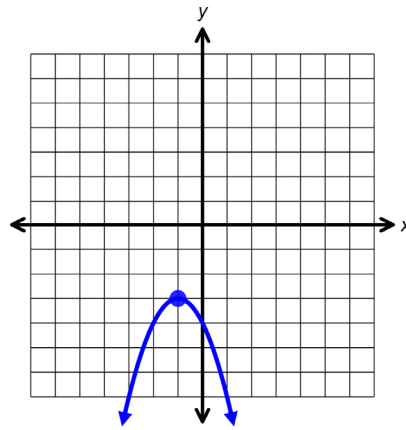9) $(x^3 + 4x^2 - 5x) - (4x^3 + x^2 - 7)$

10) $(x - 1)(2x + 3)^2$

11) $(4x^4 - 7x^3 + 15x - 7) - (-4x^2 - 10x)$

12) $(x - 6)(5x^2 + x - 8)$
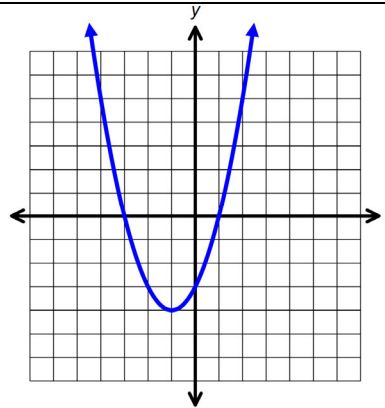
15) $(x - 2)(x + 6)(x - 4)$

18) Which function is represented by the graph?

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

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

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

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

19) Which function is represented by the graph?

A) $f(x) = (x - 3)(x - 1)$

B) $f(x) = (x - 3)(x + 1)$

C) $f(x) = (x + 3)(x - 1)$

D) $f(x) = (x + 3)(x + 1)$

For #20 – 25, factor completely:

20) $x^3 - 27$

21) $2x^3 + 3x^2 - 8x - 12$

22) $2x^4 + 16x$

23) $6x^3 + 4x^2 - 16x$

24) $x^4 - 10x^2 + 9$

25) $2x^4 - 4x^3 + 3x - 6$