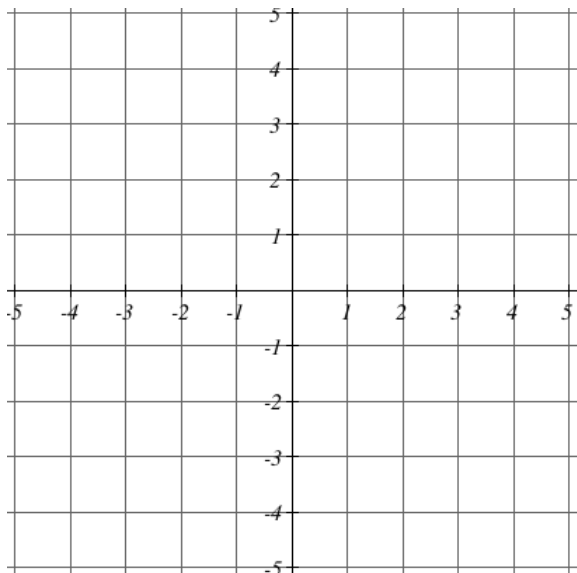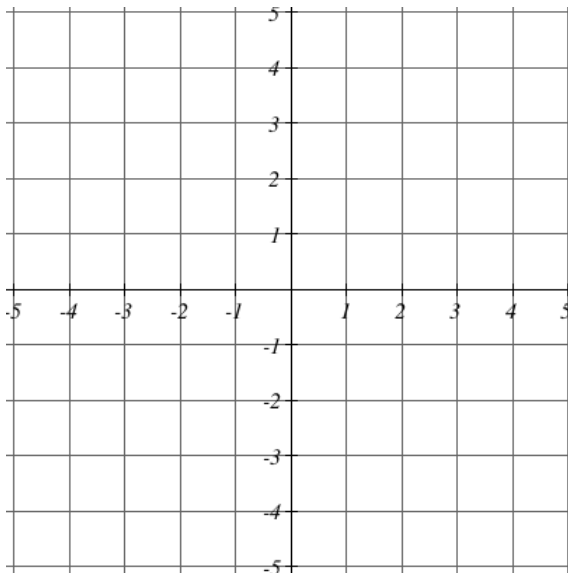1. Find an equation of the line that goes through the points (8,36) and (-9,-49). Write your answer in the form $= mx + b$.

2. The equation of the line with slope -2 that goes through the point $(-5, -5)$ can be written in the form $y = mx + b$

3. Graph the equation $3x - 4y = 16$.

4. Identify the Slope and Intercepts of the function $f(x) = \frac{1}{2}x - 3$. Then draw an accurate graph of the function.

5. Multiply and simplify each of the following completely.

Give your answers as simplified expressions written in descending order.

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

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

6. Multiply and simplify each of the following completely.

Give your answers as simplified expressions written in descending order.

$(x - 8)^2$ $(2s + 8)^2$

$(s - 7)(s^2 + s - 6)$ $8(m - 3)(m + 9)$

7. Factor completely: $49 - r^2$

8. Factor completely; $y^2 - 8y + 16$

9. Factor completely: $2w^3 - 242w$

10. Factor completely: $z^2 + 14z + 45$

11. Factor completely: $4z^4 - 4z^3 - 120z^2$

12. Solve the inequality $10x \le 2(-7x + 60)$.

Write your answer as an inequality and in interval notation, then graph the solution set on the number line.

13. Solve the inequality and write your answer in interval notation.
Use "U" between the two intervals. Use "oo" (two lower case o's) for ∞ .

$12 + 5x \ge 15x - 17$

14. Given the function

$$f(x) = \begin{cases} -2x^2 - 5 & x < -1 \\ -4x^2 - 1 & -1 \le x \le 1 \\ 7 & x > 1 \end{cases}$$

Calculate the following values:

$f(-2) =$
$f(1) =$
$f(2) =$

15. Given the function
$$f(x) = \begin{cases} 9x - 4 & x < 0 \\ \sqrt{9x^2 + 16} & x \ge 0 \end{cases}$$
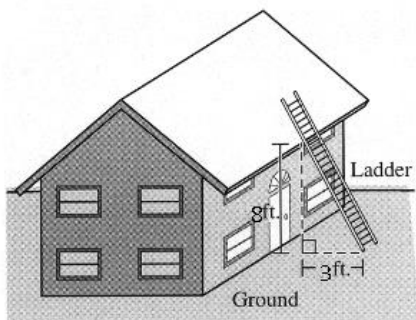
Calculate the following values:
$f(-1) =$
$f(0) =$
$f(2) =$

16. Solve the equation: $y = \frac{4}{10-x}$ for x

17. Solve the equation $\frac{p}{d+b} = \frac{g}{d}$ for d

18. What is the **minimum** length the ladder must be to reach the roof if the height is 8 feet and the base of the ladder is 3 feet from the wall? Round your answer UP to the nearest tenth of a foot.
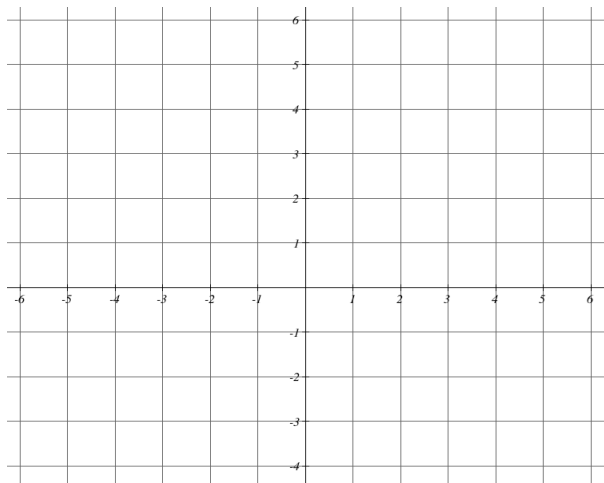

Ladder
8ft.
3ft.
Ground

19. What is the altitude of the plane? Round your answer to the nearest meter.

890 m

800 m

Note: Figure is not drawn to scale.
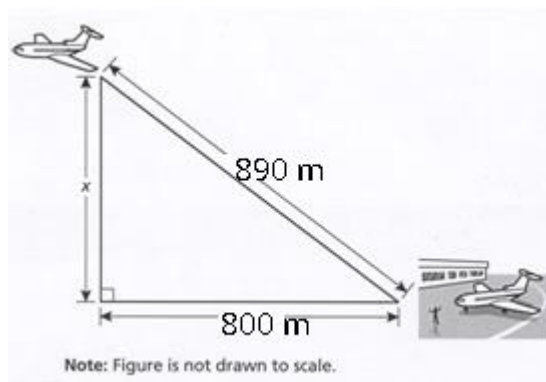
20. Solve the equation: $m^2 = 6m$

21. Solve the equation: $x^2 = -3x + 4$

22. Given the function $f(x) = 2(x-2)^2 - 2$ determine the vertex and graph:

23. Given the function $f(x) = 2(x+1)^2 - 1$ determine the vertex and graph:
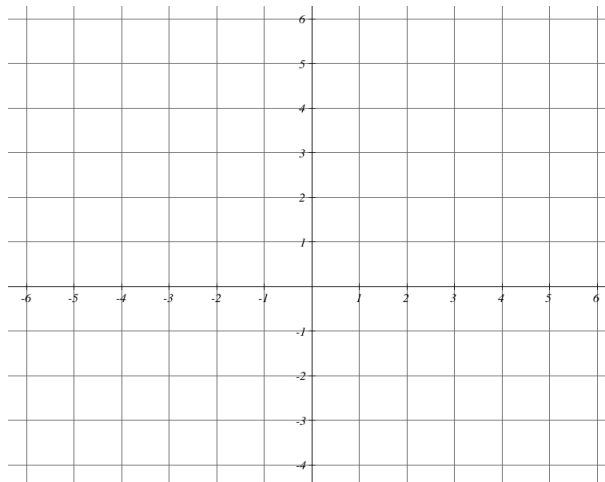
24. The weekly pay that Christy receives varies directly with the number of hours she works. If she works 31 hours she makes \$561.72. How much money would she make if she works 40 hours?

25. The loudness, , of a sound (measured in decibels, dB) is inversely proportional to the square of the distance, d , from the source of the sound. A person 9 feet from a jetski, it is 80 decibels loud. How loud is the jetski when the person is 42 feet away?

26. The number of hours required to build a fence is inversely proportional to the number of people working on the fence. If it takes 4 people, 57 hours to complete the fence, then how long will it take 15 people to build the fence? (round answer to 2 decimal places if needed)

27. Solve the rational equation:

$$\frac{6t}{t^2-100} + \frac{2}{t+10} = \frac{1}{t-10}$$

28. Solve for x $\quad \frac{5}{x-2} = \frac{-3}{x+4}$

29. Simplify the following expression completely: $v^9 \cdot v^{19}$

30. Simplify the following expression completely: $(3z^9)(8z^8)$

31. Solve the equation: $\sqrt{10x-5} - 2 = x$

32. Solve and Check: $3 + \sqrt{x-1} = 9$

33. Let $f(x) = \sqrt{2x + 21}$ and $(x) = x - 1$.

Find the following functions. Simplify your answers.

$f(g(x)) = \,,$

$g(f(x)) = \,.$

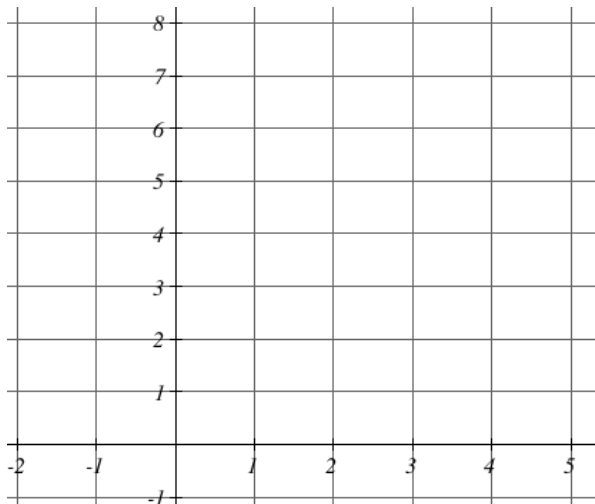**34.** Let $f(x) = \sqrt{2x + 19}$ and $(x) = x - 6$.

Find the following functions. Simplify your answers.

$f(g(x)) = \,,$

$g(f(x)) = \,.$

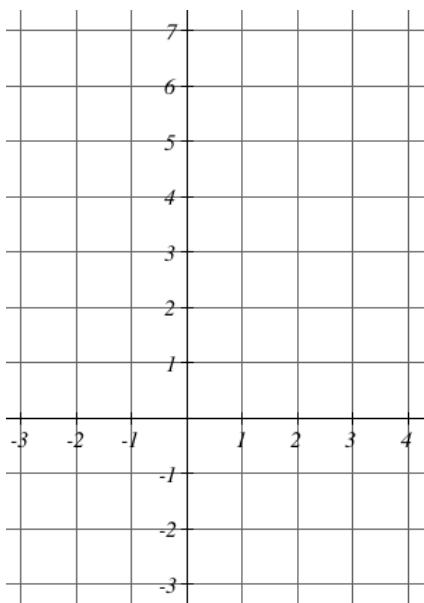**35.** Graphing Exponential Functions

$f(x) = 5\left(\frac{1}{3}\right)^x$

36. Draw the Horizontal Asymptote and the graph of $f(x) = 6^x - 2$

37. Solve the given equation for . $6^{5x-2} = 48$

38. Convert $50(1.03)^x = 2225$ to logarithmic form and use the change of base formula to solve for . *Round answer to 3 decimal places.*

<u>Hint</u>: The change of base formula is $\log_b a = \frac{\log a}{\log b}$

39. Solve for : $3^x = 44$
You may enter the exact value or round to 4 decimal places.

40.

(a) If $\log_8 x = 9$, then $x = $.
(b) If $\log_5 x = 3$, then $= $.

41. Solve for m in the equation below. It may be helpful to convert the equation into exponential form.

$$\log_2 32 = m$$

42. For each of the following angles, find the radian measure of the angle with the given degree measure (you can enter π as 'pi' in your answers):

$250°$ $\qquad$ $-260°$ $\qquad$ $-240°$

$220°$ $\qquad$ $-120°$

43. Convert the angle $\frac{31\pi}{18}$ radians to degrees.

44. One angle in a triangle has a measure that is three times as large as the smallest angle. The measure of the third angle is 40 degrees more than that of the smallest angle. Find the measure of the LARGEST angle.

45. One angle in a triangle has a measure that is three times as large as the smallest angle. The measure of the third angle is 20 degrees more than that of the smallest angle. Find the measure of the LARGEST angle.

46. Evaluate the following expressions. The answer must be given as a fraction, NO DECIMALS.

If $\tan(\theta) = -\frac{8}{7}$ and $\sin(\theta) < 0$, then find
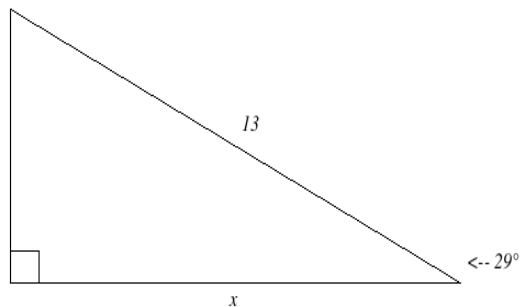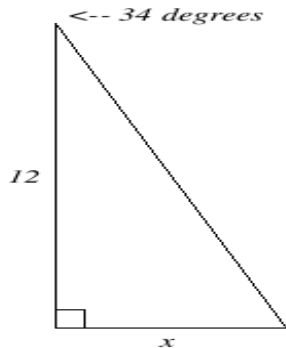
(a) $\sin(\theta) =$

(b) $\cos(\theta) =$

(c) $\sec(\theta) =$
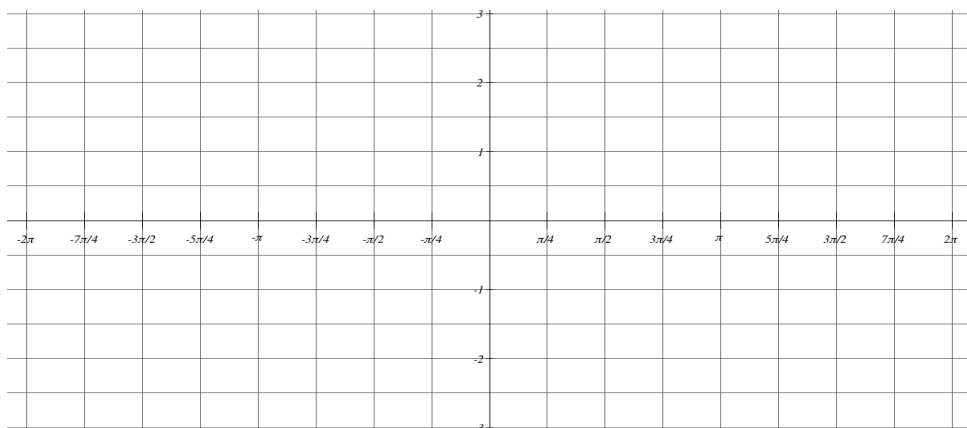
(d) $\csc(\theta) =$

(e) $\cot(\theta) =$

47. For the right triangle below, find the length of . Round to the hundredths. (2 decimal places)

48. For the right triangle below, find the length of . Round to the hundredths. (2 decimal places)

13

<-- 29°

x

<-- 34 degrees

12

x

49. Sketch a graph of the function $f(x) = \sin(x)$.

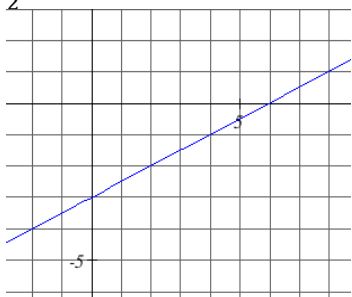**50.** Sketch a graph of the function $f(x) = 4\sin\left(\frac{2}{3}x\right)$

SUNY
CORNING
COMMUNITY COLLEGE
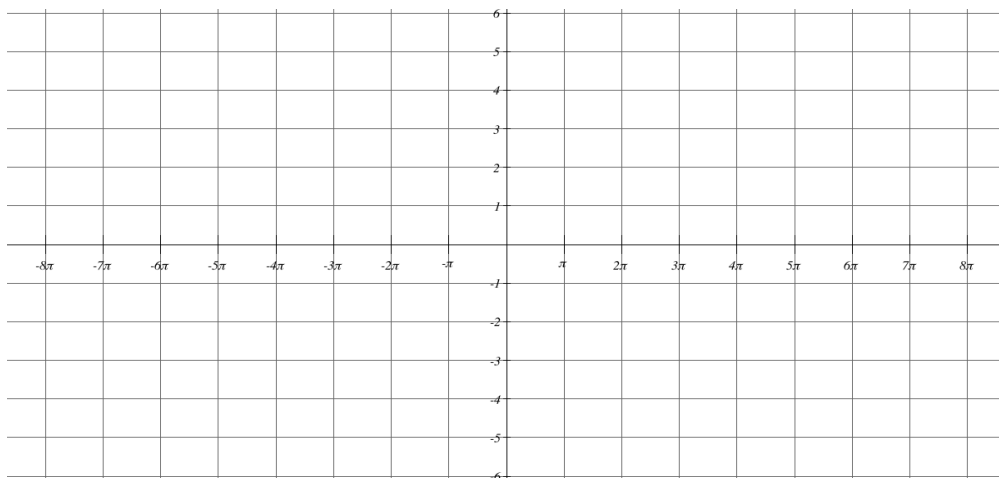
Key - Form 1

1. $y = 5x - 4$
2. $-2 \sim -15$
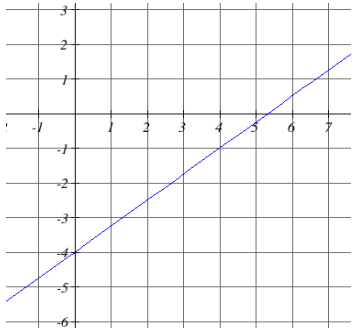
3.

4. $\frac{1}{2} \sim (0, -3) \sim (6,0) \sim$

5. $-5x^2 - 4x \sim x^3 + 8x^2 - 7x \sim x^2 - 7x - 30 \sim x^2 + 4x + 4$

6. $x^2 - 16x + 64 \sim 4s^2 + 32s + 64 \sim s^3 - 6s^2 - 13s + 42 \sim 8m^2 + 48m - 216$

7. $(7 + r)(7 - r)$
8. $(y - 4)^2$
9. $2w(w + 11)(w - 11)$
10. $(z + 9)(z + 5)$
11.
Hint: You first need to take out the greatest common factor of $4z^2$. Then, you can factor as $4z^2(z - 6)(z + 5)$.

12. $x \leq 5 \sim (-\infty, 5] \sim$

13. $\left(-\infty, \frac{29}{10}\right]$
14. $-13 \sim -5 \sim 7$

15. $-13 \sim 4 \sim 7.211102550928$
16. $x = \frac{10y-4}{y}$
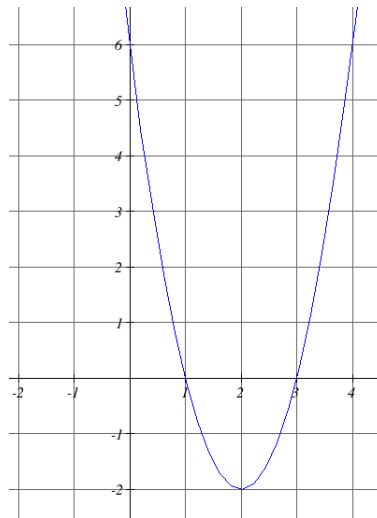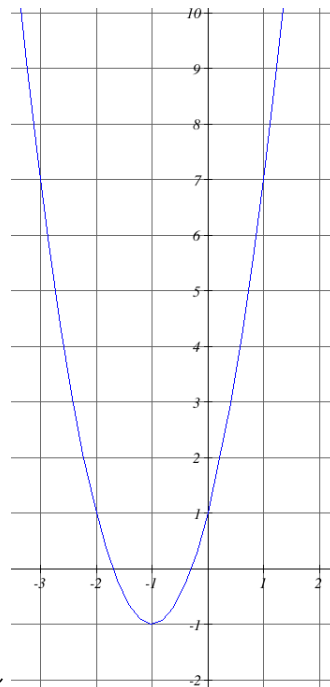17. $g \cdot \frac{b}{p-g}$
18. 8.6
19. 390
20. 0,6
21. -4,1

22. $(2, -2) \sim$

23. $(-1, -1) \sim$
24. 724.8
25. 3.6734693877551
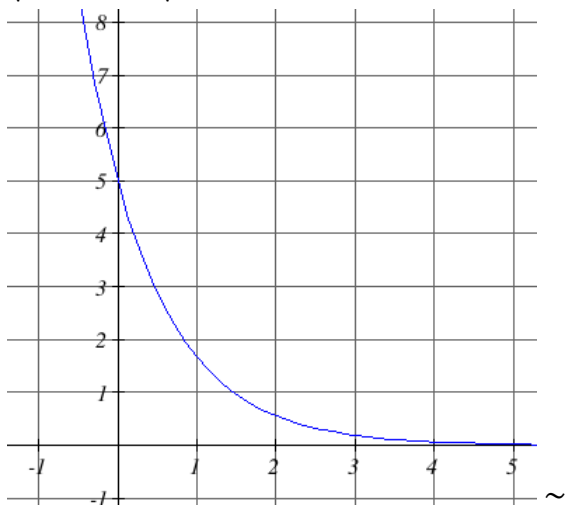26. 15.2

27. $\frac{30}{7}$

28. -1.75
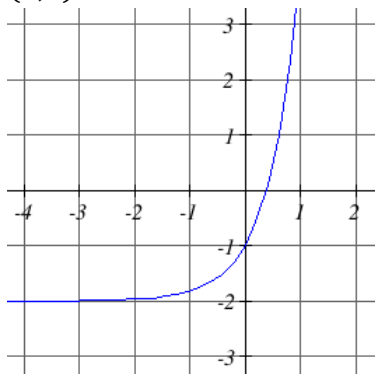
29. v^{28}

30. $24 \cdot z^{17}$

31. 3,3

32. 37

33. $\sqrt{2x+19} \sim \sqrt{2x+21} - 1$

34. $\sqrt{2x+7} \sim \sqrt{2x+19} - 6$

35. ~

(0,5)

36.

37. 0.83211168434073

38. 128.405

39. 3.4445178457871

40. 134217728 ~ 125

41. 5

42. 4.3633231299858 ~ -4.5378560551853 ~ -4.1887902047864 ~ 3.8397243543875 ~ -2.0943951023932
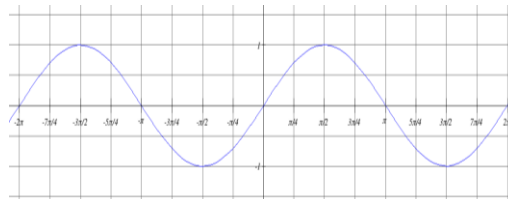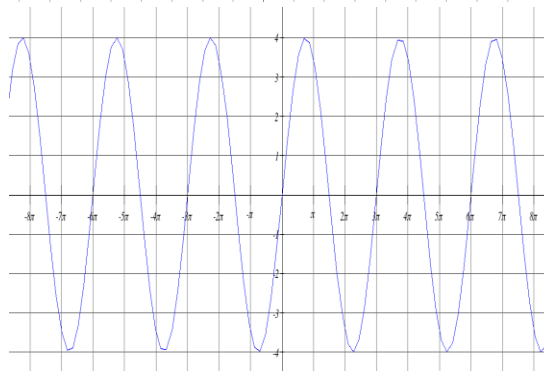
43. 310

44. 84

45. 96

46. $-\frac{8\sqrt{113}}{113} \sim \frac{7\sqrt{113}}{113} \sim \frac{\sqrt{113}}{7} \sim -\frac{\sqrt{113}}{8} \sim -\frac{7}{8}$

47. 11.370056192812

48. 8.0941022021091

49.

50.