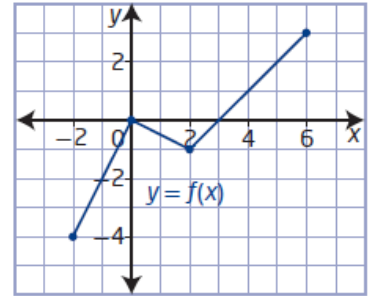


Pre-Calculus 30 – Comprehensive Review - Chapters 1, 2, 3, 7 & 8

Chapter 1 - Outcome 30-7 Review

Level 2

1. Consider the graph of $y = f(x)$.

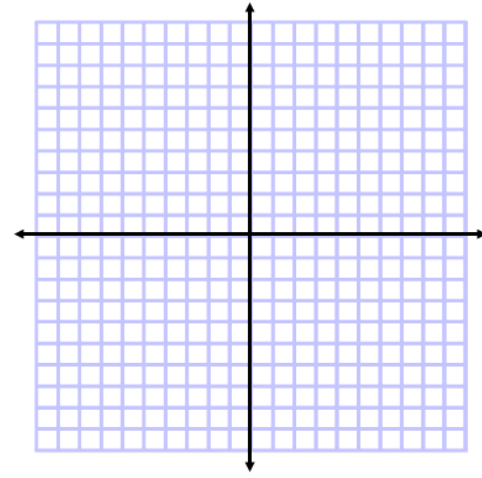
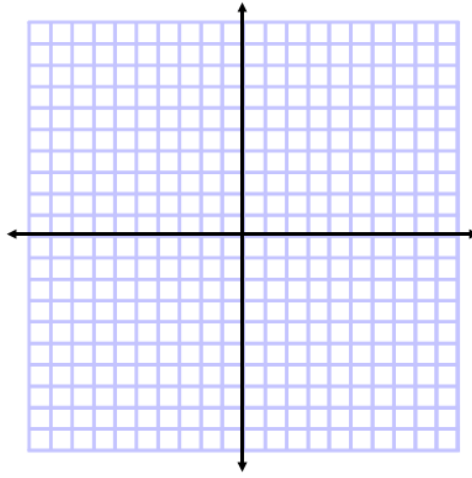
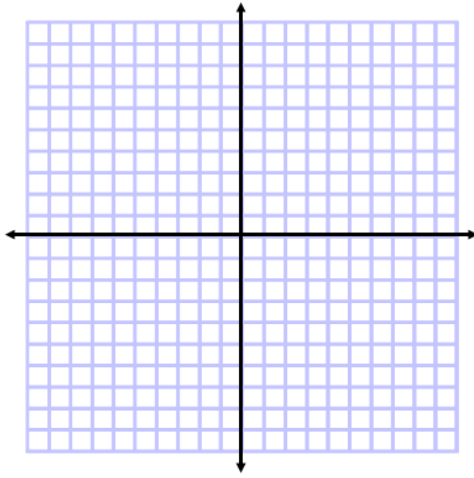


a) Sketch each of the transformed function:

i) $y = f(x + 3)$

ii) $y = -2f(x)$

iii) $y = f\left(\frac{1}{2}x\right) - 2$



2. For each equation, describe how the graph was translated, reflected or stretched.

a) $y = -2f(3(x-4))$

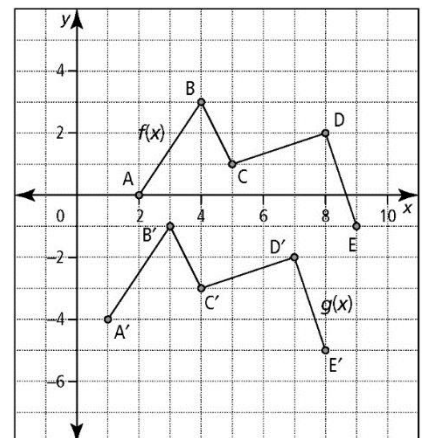
b) $y = f(x - 5) - 3$

c) $y = f(-2x) + 5$

3. Consider the graph of $y = f(x)$ and $y = g(x)$.

Determine the equation of the translated function in the form

$y = af(b(x - h)) + k$.



5. Determine algebraically the equation of the inverse of each function.

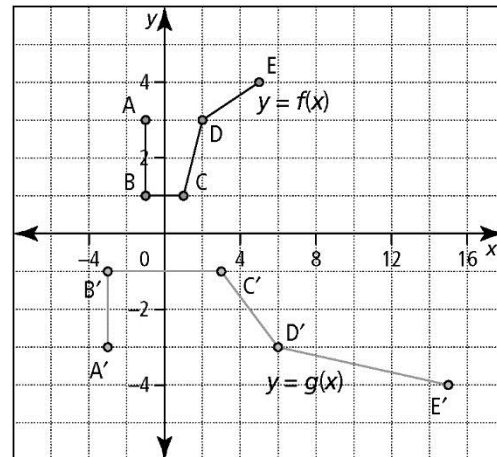
a) $f(x) = 3x - 6$

b) $f(x) = x^2 - 7$

c) $y = (x - 5)^2 - 9$

Level 3

6. Describe the transformation that must be applied to the graph of $f(x)$ to obtain the graph of $g(x)$. Then, determine an equation for $g(x)$.

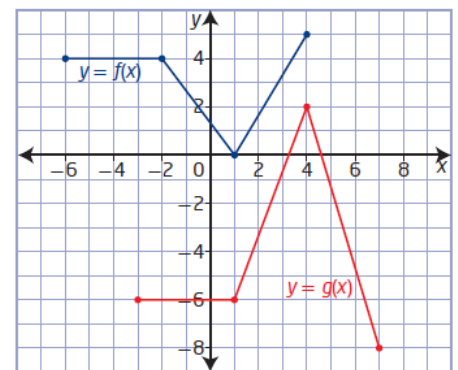


7. Write the equation for each transformation of $y = x^2$ in the form

$y = af(b(x - h)) + k$.

- a) a vertical stretch by a factor of 3, reflected in the y -axis, and translated 3 units left and 2 units down
- b) a horizontal stretch by a factor of 2, reflected in the x -axis, and translated 7 units up

9. The graph of the function $y = g(x)$ represents a transformation of the graph of $y = f(x)$. Determine the equation of $g(x)$ in the form $y = af(b(x - h)) + k$.



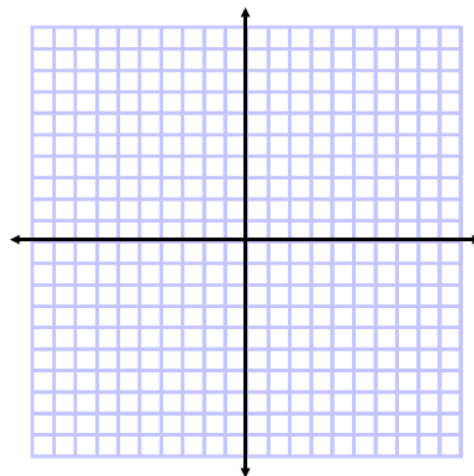
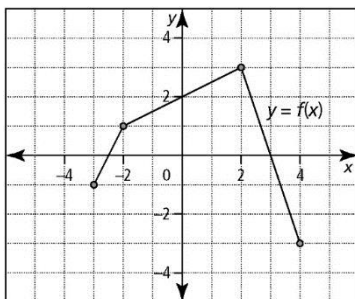
10. The key point $(-18, 12)$ is on the graph of $y = f(x)$. What is its image point under each transformation of the graph of $f(x)$?

a) $-3f(x + 5) + 4$

b) $y = 2f(6x)$

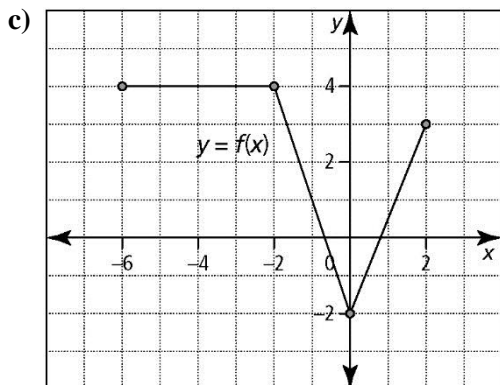
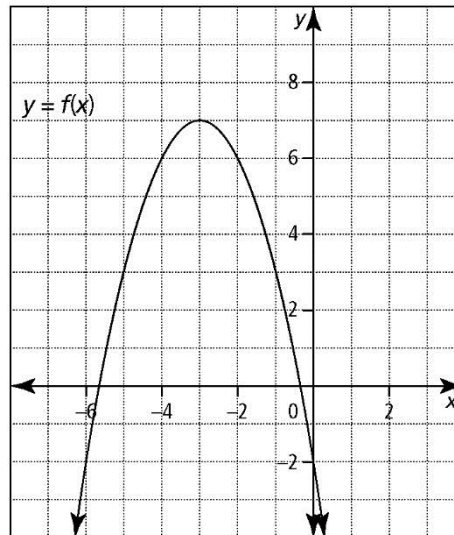
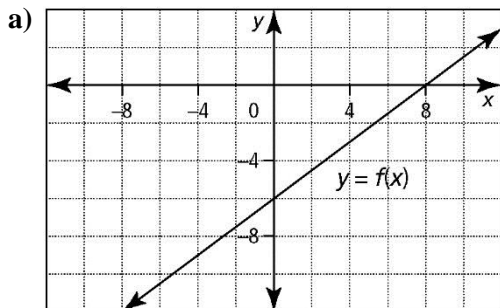
11. Consider the graph of the function $y = f(x)$.

Sketch $y = f(x)$ to $y = 3f(-2(x - 1)) + 4$.



Level 4

12. Sketch the graph of its inverse, $x = f(y)$. Determine whether the inverse is a function. If the inverse is not a function, restrict the domain of the original graph to make it a function.



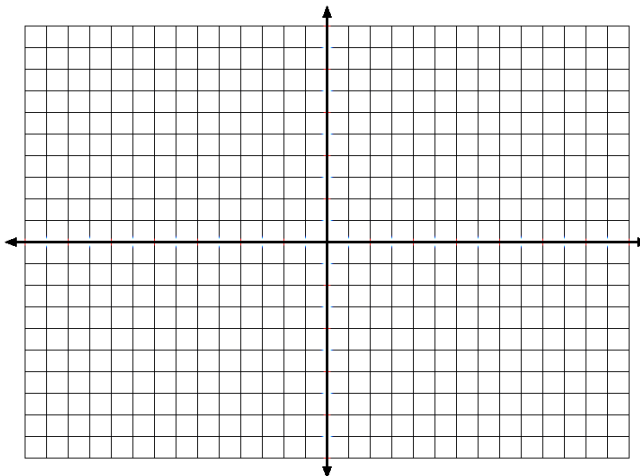
Chapter 2 - Outcome 30-11A

1. Identify a, b, h and k for each of the following

a) $y = 5\sqrt{x+7} - 2$

b) $y = -4\sqrt{-x} + 8$

2. Graph $y = \sqrt{x}$



Level 3

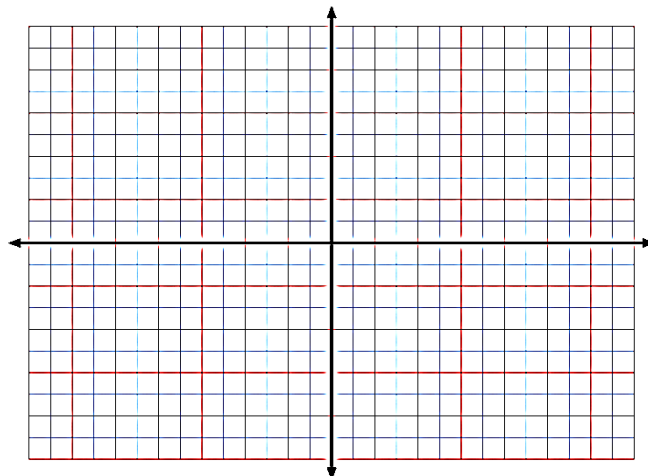
3. Write the equation of a radical function that would result by applying each set of transformations to the graph of $y = \sqrt{x}$.

a) vertical stretch by a factor of 3, and horizontal stretch by a factor of 2

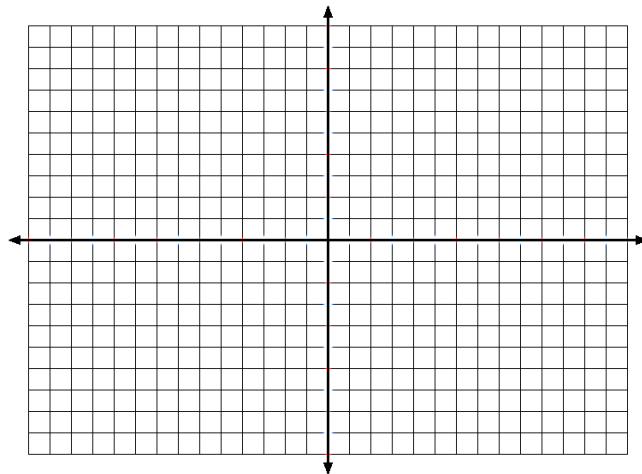
b) horizontal reflection in the y-axis, translation up 3 units, and translation left 2 units

4. Graph the functions below. Then, identify the domain and range.

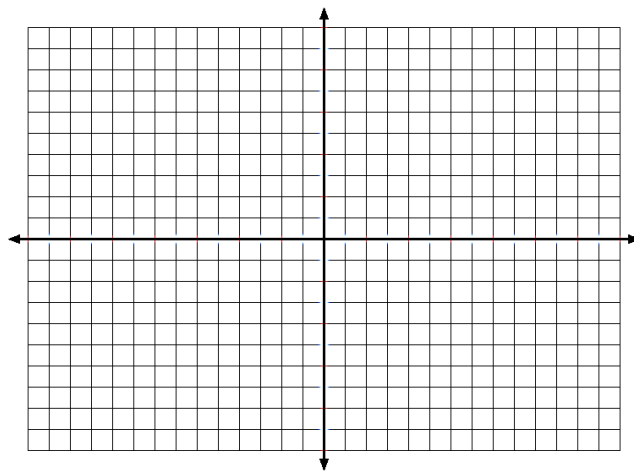
a) $y = -2\sqrt{x-2}$



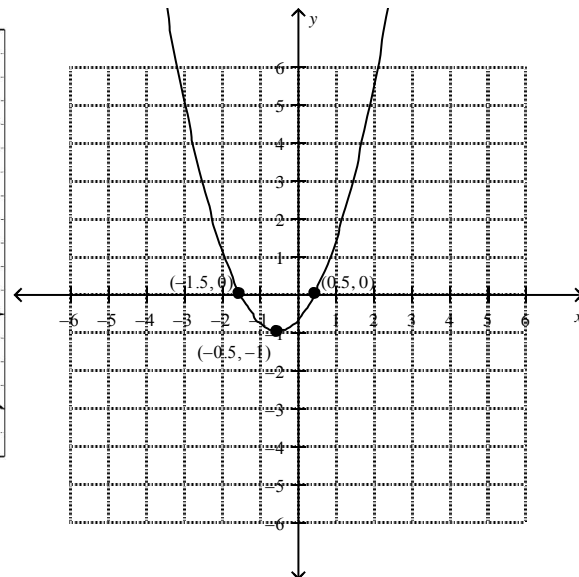
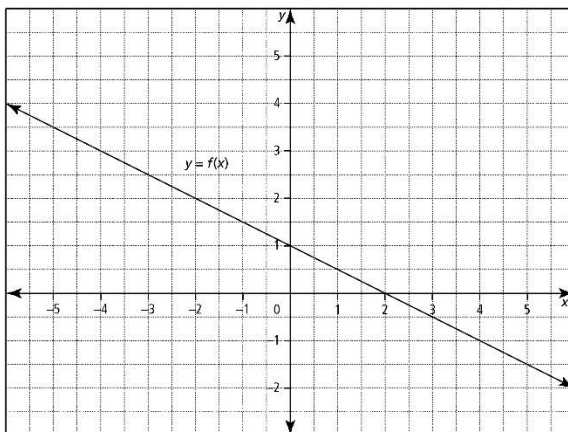
b) $y = \sqrt{2x} - 4$



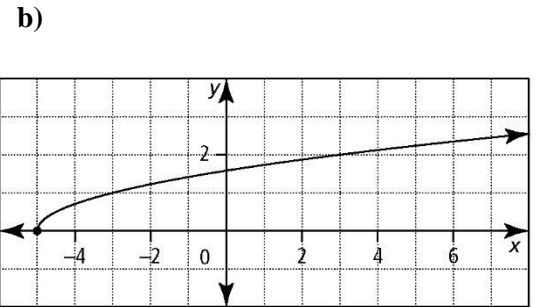
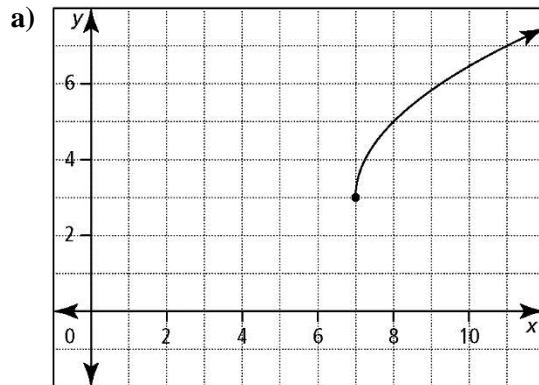
c) $y = 2\sqrt{-(x-3)} + 1$



5. Graph $\sqrt{f(x)}$ from the following graphs of $f(x)$ and state the **domain and range**



6. For each function, write an equation of a radical function of the form $y = a\sqrt{b(x-h)} + k$.



Chapter 3 - Outcome 30-10A Review

1. Divide the following using long division or synthetic division.

a) $(2w^4 + 3w^3 - 5w^2 + 2w - 27) \div (w + 3)$

b) $\frac{2x^3 - 10x^2 - 15x - 20}{x + 5}$

2. Determine the remainder when $x^3 + x^2 - 16x - 16$ is divided by

a. $x + 2$

b) $x - 4$

b) Are any of the binomials above a factor of $x^3 + x^2 - 16x - 16$?

3. Factor completely

a. $x^3 + 2x^2 - 13x + 10$

b. $x^4 - 26x^2 + 25$

4. Determine the value(s) of k so that the binomial is a factor of the polynomial: $x^2 - 8x - 20$, $x + k$

5. The following polynomial has a factor of $x - 3$. What is the value of k ? $kx^3 - 10x^2 + 2x + 3$

Chapter 3 - Outcome 30-10B Review

1. Determine which of the following are polynomials. For each polynomial function, state the degree.

a) $h(x) = 5 - \frac{1}{x}$

b) $y = 4x^2 - 3x + 8$

c) $g(x) = -9x^6$

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

2. What is the leading coefficient, degree and constant term of each polynomial function?

a) $f(x) = -x^3 + 6x - 8$

b) $y = 5 + 2x^2$

c) $g(x) = 7x^3 + 3x^5 - 8x + 10$

d) $k(x) = 9x - 2x^2$

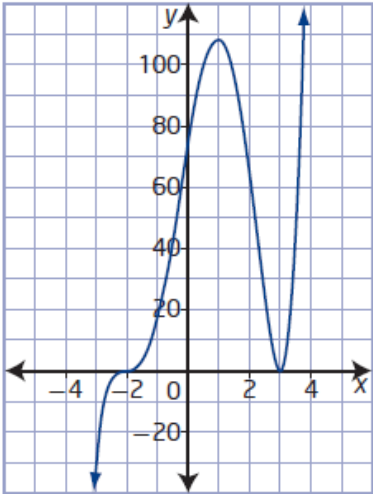
3. Identify the following characteristics for each polynomial function:

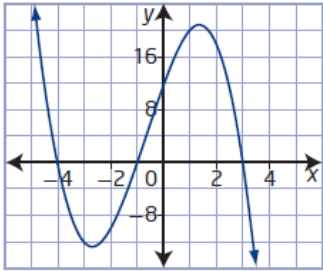
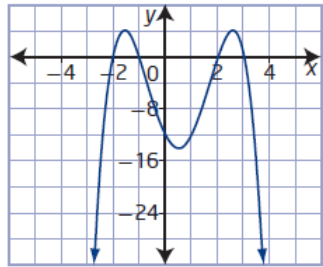
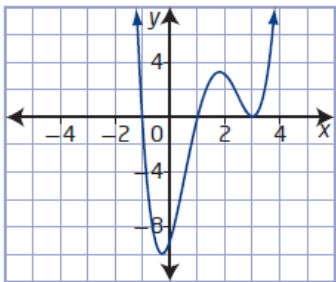
- the type of function and whether it is of even or odd degree
- the end behaviour of the graph of the function
- the number of possible x -intercepts
- the y -intercept

a) $g(x) = -2x^4 + 6x^2 - 7x - 5$

b) $f(x) = 2x^5 + 1x^3 - 12$

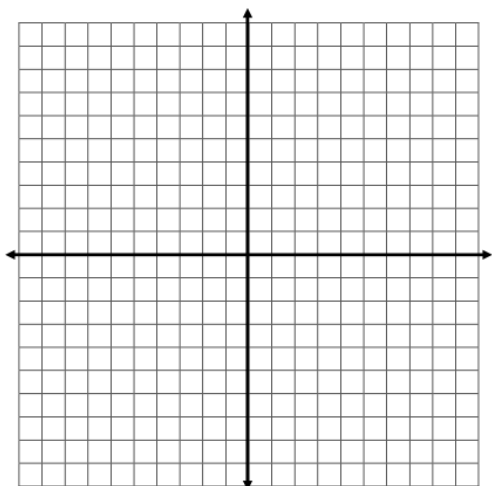
4. Fill in the table below for the following graphs

Graph	Odd or Even	Sign of Leading Coefficient	Number of x -intercepts	Intervals where the function is positive	Intervals where the function is negative
					

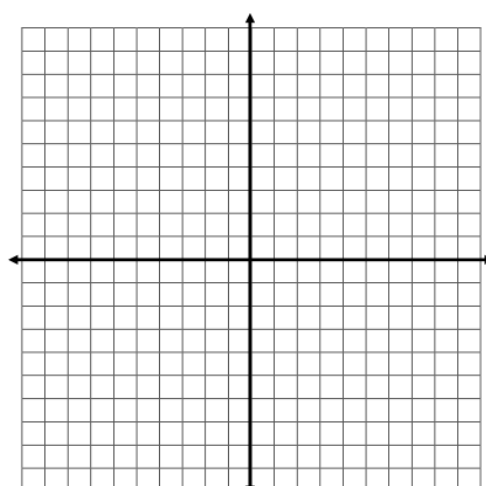
	Odd or Even	Sign of Leading Coefficient	Number of x-intercepts	Intervals where the function is positive	Intervals where the function is negative
					
					
					

4. Graph the following polynomial functions. The first three have already been factored for you.

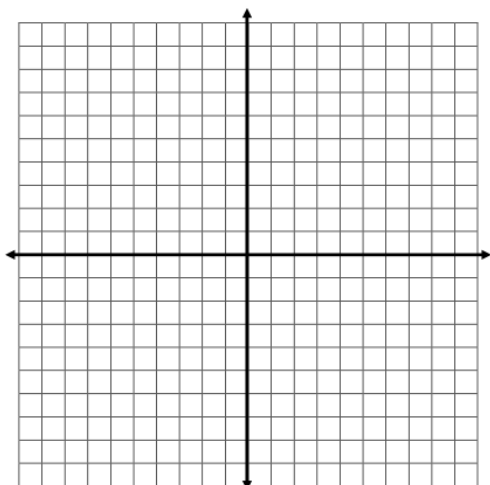
$$y = -2(x - 1)^2(x + 2)(x - 4)^2$$



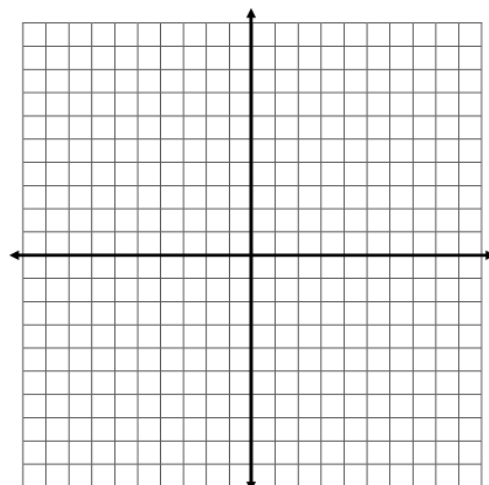
$$y = -2x(x + 5)^3$$



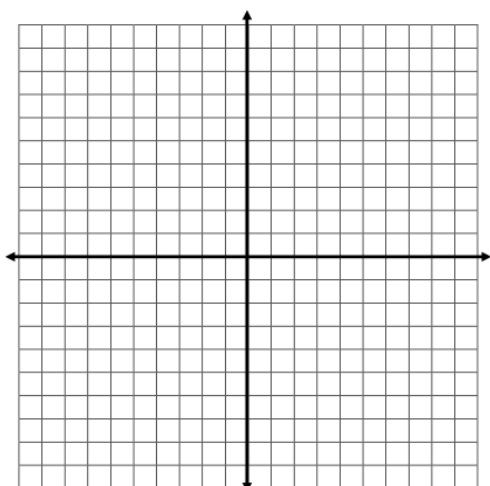
$$y = (x + 1)^3(x - 2)$$



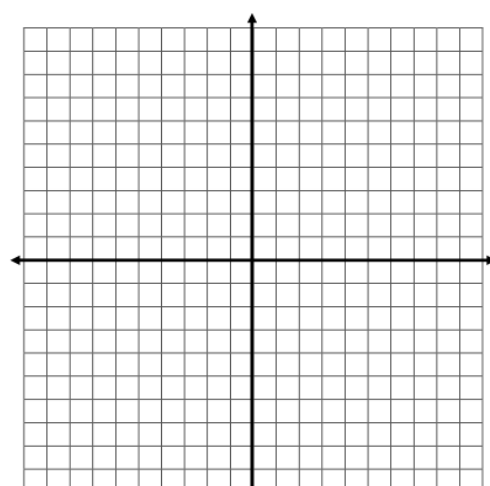
$$y = x(x + 4)^3(x - 3)^2$$



$$f(x) = -x^4 + 19x^2 + 6x - 72$$



$$y = x^3 + 4x^2 - x - 4$$



Chapter 7 – Outcome 30.9c

Level 2

1. Solve

a) $2^x = 64$

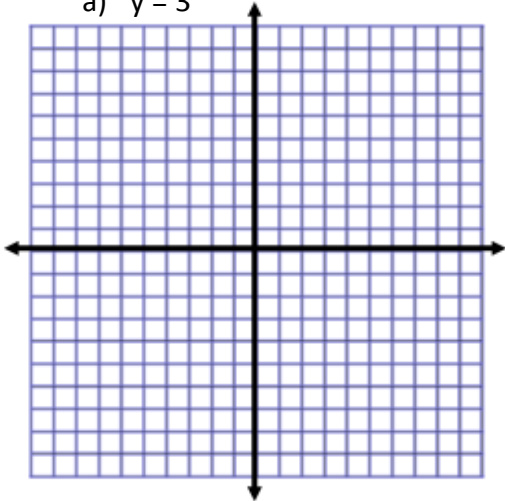
b) $3^x = 27^{x-2}$

c) $8^{2x} = 16^{x+3}$

d) $9^{2x-5} = 27^{x+6}$

2. Graph each of the following, and then determine the:

a) $y = 3^x$



Domain:

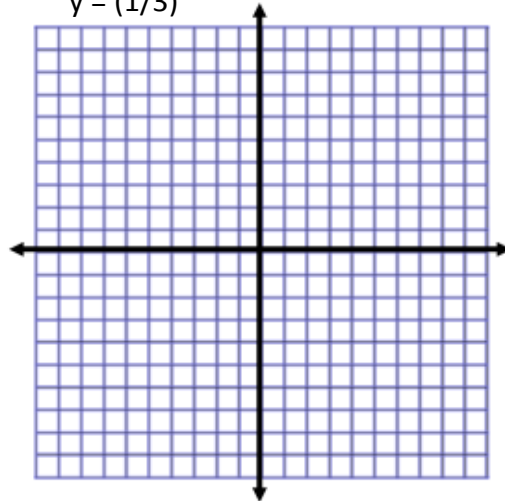
Range:

Horizontal asymptote

Y intercept:

Increasing or Decreasing:

$y = (1/3)^x$



Domain:

Range:

Horizontal asymptote

Y intercept:

Increasing or Decreasing:

2. . Identify all of the transformations of the following: (ie vertical translation up 2)

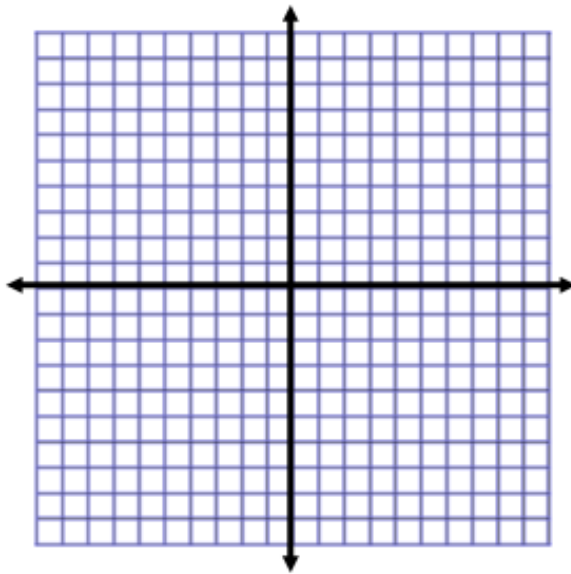
a) $f(x) = 3^{-x} + 5$

b) $h(x) = -2\left(\frac{1}{3}\right)^{x+1}$

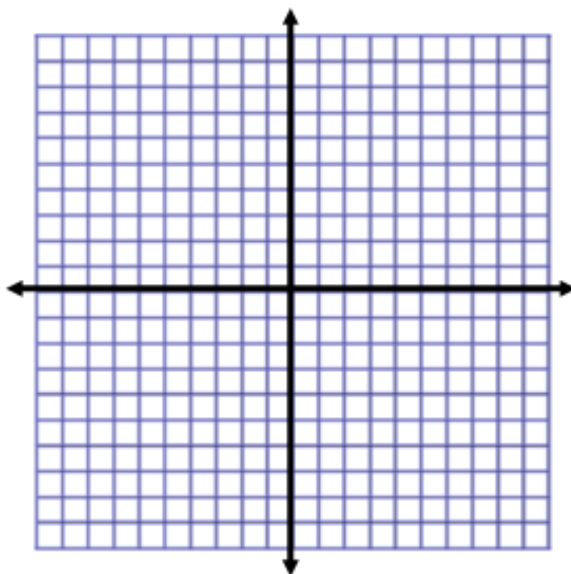
Level 3

4. Sketch the graph of

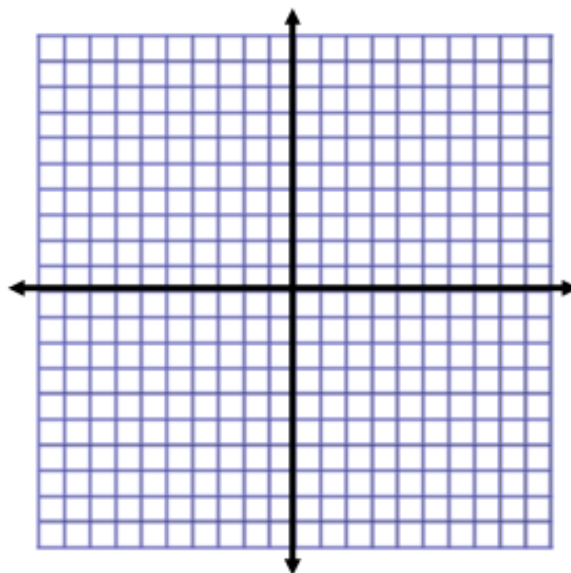
$y = -3^{x-2}$



$y = 3(2^{-x}) - 5$



$$y = 2^{2x+4} - 1$$



Chapter 8 – Part 1

Level 2

- Express as a logarithmic statement.

$$2^3 = 8$$

- Express as an exponential statement.

$$\log_3 81 = 4$$

- Determine the value of each logarithm.

a) $\log_5 25$

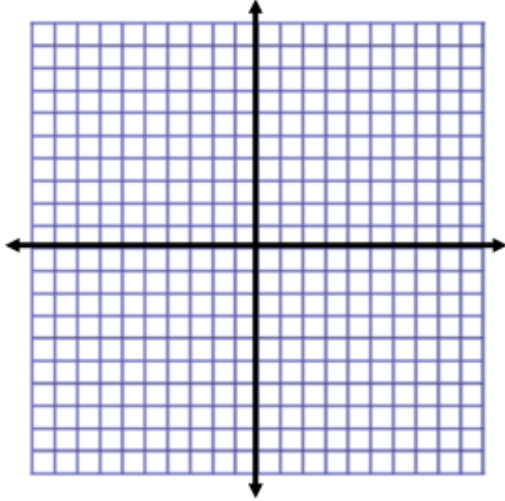
c) $\log_9 1$

b) $\log_2 \frac{1}{8}$

d) $\log_6 6$

4. Graph each of the following and determine

b) $y = \log_2 x$



Domain:

Range:

Vertical asymptote

x intercept:

y intercept:

5. Identify all of the transformations of the following: (state all stretches/reflections/translations up, down left or right)

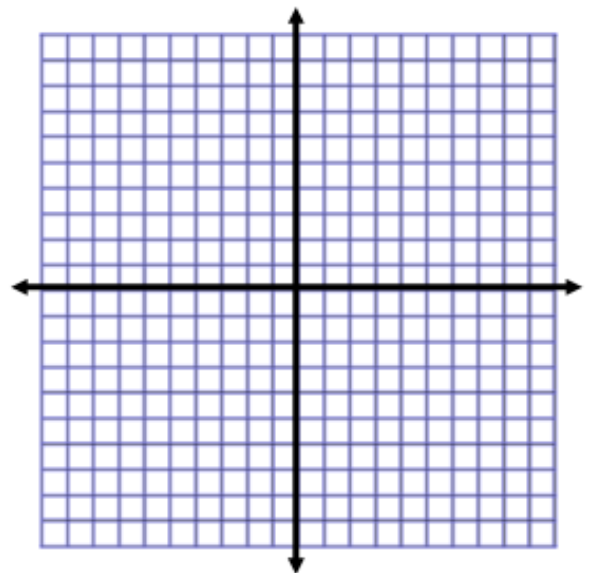
a) $y = -2\log_3(x - 5) + 2$

$y = 2\log_3(-x) + 1$

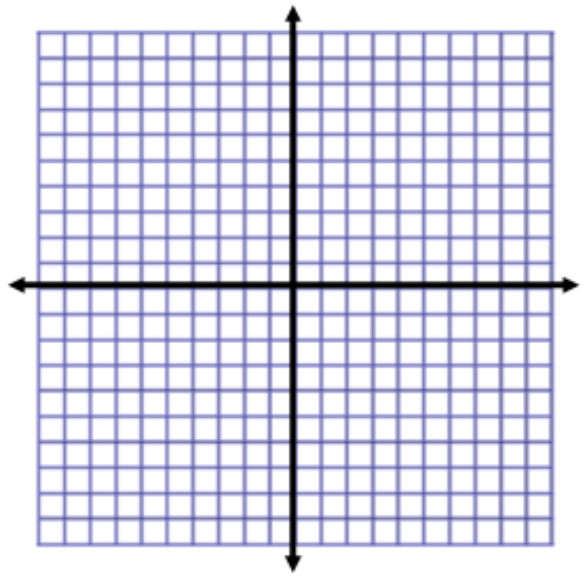
Level 3

6. Sketch

$y = -\log_2(x + 1) - 2$



$$y = 2 \log_3(x - 2) + 1$$



Chapter 8 Part 2

Level 2

1. Use your laws of logarithms to expand each of the following:

a) $\log_4 \frac{x}{3}$

b) $\log_4 x^5$

c) $\log_2 yx^5$

2. Use the laws of logarithms to simplify each of the following:

a) $\log 2 + \log 7$

b) $4 \log_3 5$

c) $\log_2 42 - \log_2 6$

3. Determine the value of x.

a) $\log_2 x = 3$

b) $3 \log_5 x = \log_5 125$

c) $6^x = 216$

d) $4^{x+1} = 64$

Level 3

4. Use the laws of logarithms to simplify and then evaluate each of the following:

a) $\log_3 270 - (\log_3 2 + \log_3 5)$

b) $3\log_2 6 - 3\log_2 3$

5. Write each expression in terms of individual logarithms.

a) $\log_2 \frac{x^5 \sqrt[3]{y}}{7z}$

b) $\log_5 \sqrt{xy^3}$

6. Write each expression as a single logarithm.

a) $3 \log w + \log \sqrt{w} - 2 \log w$

b) $\log_2(x + 6) + \log_2(x - 1)$

7. Solve for x.

a) $\log_5 x + 6 = 8$

b) $\log_4 x + 2\log_4 x = 6$

c) $\log_2 x^2 - \log_2 5 = \log_2 20$

d) $\log_3(x + 7) - \log_3(x - 3) = 2$

e) $3^x = 100$

f) $7^{x-3} = 517$

Level 4

8. Solve the following. State any restrictions

$$\log_6(x + 3) - 2 = -\log_6(x - 2)$$

9. Use what you have learned about logarithms to show how you could use two different transformations to graph the logarithmic function $y = \log_2 8x$

10. Simplify the following logarithm. State the restrictions

$$\log (x^2 - x - 12) - \log (x^2 - 9)$$

Chapter 9 Review

Level 2

1. Determine the characteristics of the following functions:

a) $y = \frac{2x-1}{x-4}$

Equation of Vertical Asymptotes:

Points of Discontinuity (holes):

Equation of Horizontal Asymptote:

b) $y = \frac{x+5}{(x+5)(x-3)}$

Equation of Vertical Asymptotes:

Points of Discontinuity (holes):

Equation of Horizontal Asymptote:

c) $y = \frac{x^2-4}{x^2+3x+2}$

Equation of Vertical Asymptotes:

Points of Discontinuity (holes):

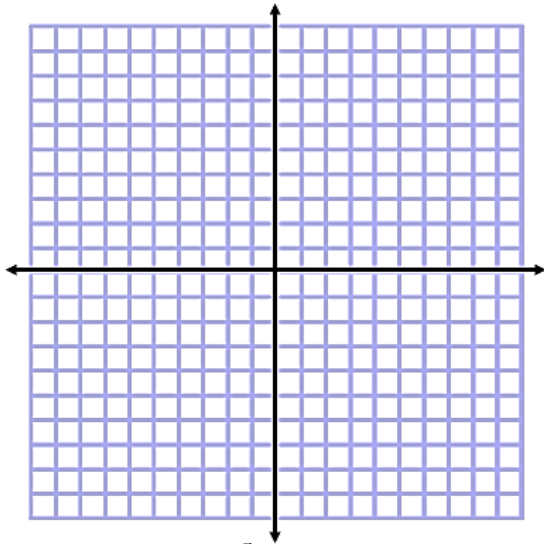
Equation of Horizontal Asymptote:

Level 3/Level 4 (Level 4 Questions will have an oblique asymptote. You will need to determine that on your own.)

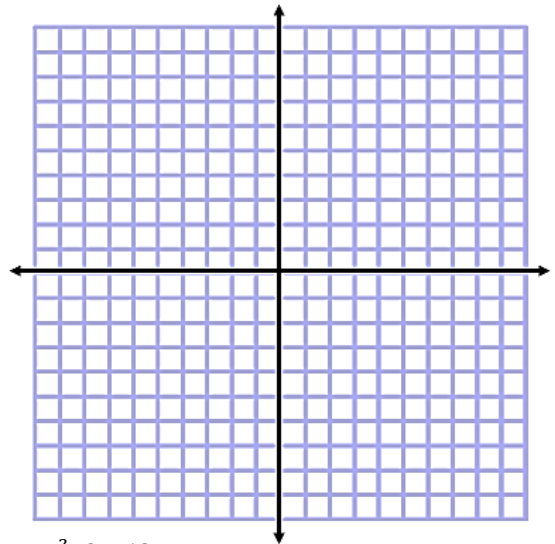
2. Graph the following functions. Be sure to give the equations of all asymptotes.

a) $y = \frac{-2x+4}{x+5}$

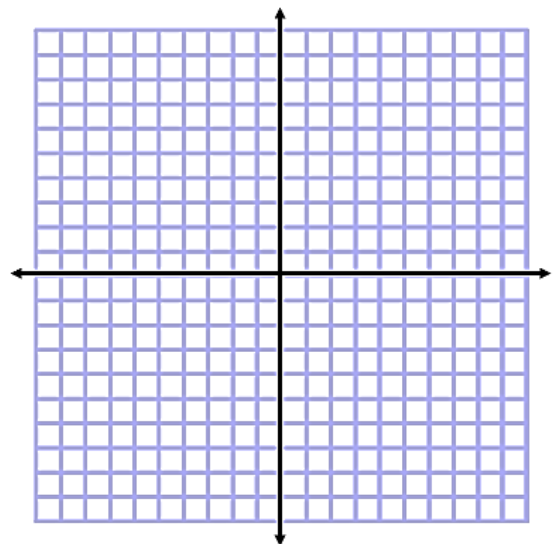
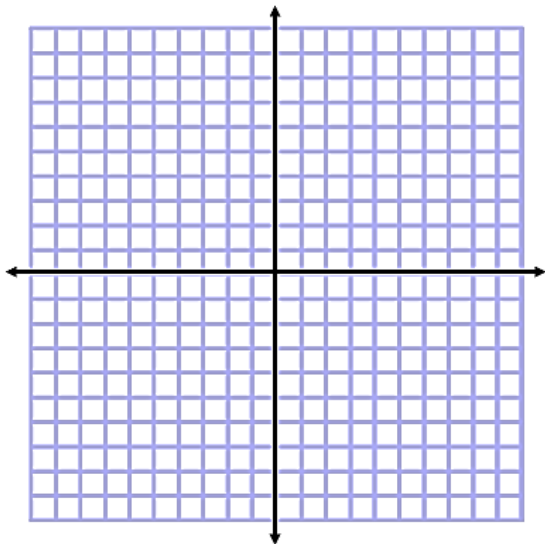
b) $y = \frac{x^2-16}{x+4}$



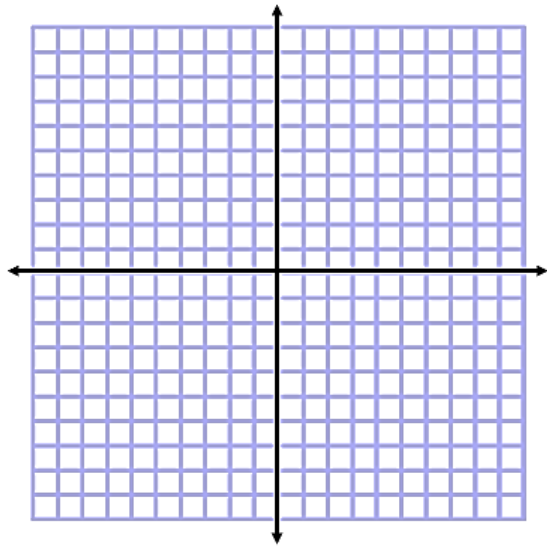
c) $y = \frac{x-5}{x^2-2x-15}$



d) $y = \frac{x^2-3x-18}{x^2+7x+12}$



$$y = \frac{x^2 - x - 6}{x - 1}$$



$$y = \frac{2x + 6}{x^2 - 9}$$

