

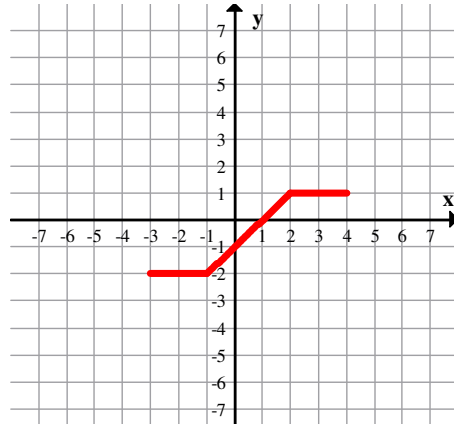
Pre-Calc 12
Midterm 1 Review

Name: _____

Ch 1 Transformations

1. Given $y = f(x)$, sketch a graph of the following:

- a. $y = 2f(x+3)$
- b. $y = f(2x-4)-1$
- c. $y = -f\left(\frac{1}{3}x\right)+2$
- d. $y = f^{-1}(x)$
- e. $y = f(-x-1)$



2. Determine the equation of $y = 2x^2 - x + 3$ after a reflection in the:

- a. x -axis
- b. y -axis

3. If $(-2, 3)$ is on the graph of $y = f(x)$, find a point that must be on:

- a. $y = f(-2x-6)-3$
- b. $y = -f\left(\frac{1}{2}x-4\right)+2$
- c. $y = f^{-1}(x)+1$
- d. $y = f^{-1}(x-1)-3$

4. Find the inverse of the following functions:

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

5. Given $f(x) = 2x^2 + x + 3$ and $g(x) = 3x + 1$, find:

- a. $f(x) + g(x)$
- b. $(f - g)(x)$
- c. $g(f(1))$
- d. $f(g(1))$
- e. $g(f(-3))$
- f. $(g \circ f)(x)$

Ch 2 Polynomials

1. Sketch and determine the domain of: $y = x(x-2)^2(x+1)$

2. Find the equation of the function with zeroes of $\frac{3}{2}$, 4, and -1 and passing through $(2, 3)$.

3. Factor fully: $f(x) = x^3 - 4x^2 - 7x + 10$

4. Solve by factoring:

- a. $2x^3 - 5x^2 - x + 6 = 0$
- b. $2x^3 - 5x^2 - 11x = 4$
- c. $2x^3 + 7x^2 + 2x = 3$

5. Solve:

a. $-x(x+3)(2x-5) \geq 0$

b. $x^4 - 9x^2 \leq 0$

6. Find the remainder when $3x^3 + 4x^2 - x + 2$ is divided by $x + 2$.

7. When $x^3 + kx^2 - 6x + 4$ is divided by $x - 4$, the remainder is -36 . Find the value of k .

8. Divide the following:

a. $\frac{3x^3 - x^2 + 2x + 4}{x + 4}$

b. $(x^4 - x^2 + 7) \div (x + 1)$

9. A piece of cardstock 40cm long and 10cm wide is used to make an open top box by cutting a square from each corner. What is the length of square that must be cut from each corner if the volume of the box must be 408 cm^3 .

Ch 3 Radical and Rational Functions

1. Find the domain and range for each:

a. $y = \sqrt{3-x}$

b. $y = -\sqrt{2x+7} - 1$

c. $f(x) = -\sqrt{-x} - 3$

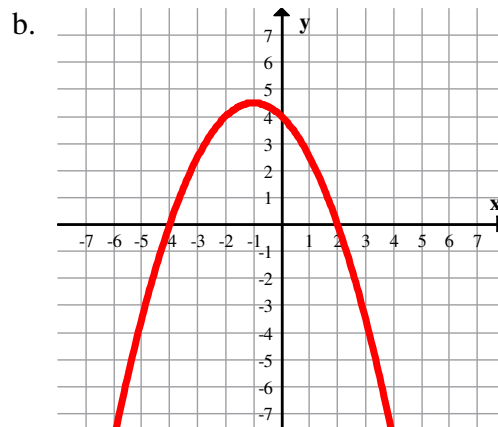
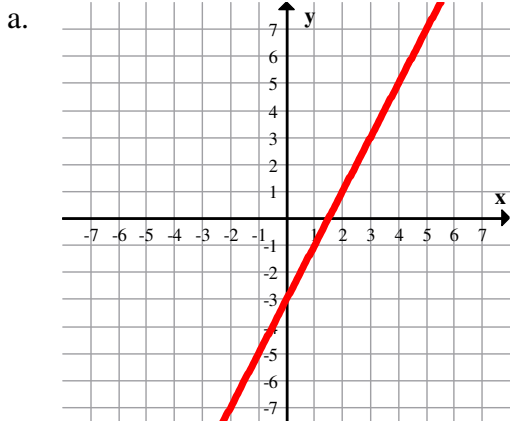
2. Solve:

a. $2\sqrt{x-3} + 5 = 15$

b. $\sqrt{x} + \sqrt{x-16} = 8$

c. $2x = \sqrt{x+3} - 5$

3. Given $y = f(x)$, sketch $y = \sqrt{f(x)}$:



4. Given the following functions, find the equations of all asymptotes, the coordinates of any holes, and the x and y -intercepts:

a. $f(x) = \frac{1}{4} - \frac{1}{x-4}$

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

c. $y = \frac{3x-2}{x+1}$

d. $y = \frac{x^2 + 4x}{x^2 + 9x + 20}$

e. $y = \frac{x^2 + 6x + 8}{x^2 - 2x - 8}$

5. Sketch the following rational expressions. Label holes and asymptotes:

a. $y = \frac{x^2 + 4x + 4}{x^2 + 3x - 10}$

b. $f(x) = \frac{2(3x-1)(x+4)}{3x^2 + 10x - 8}$

Ch 4 Logarithms

1. Graph $y = 3^x$ and $y = 3^{x+1} - 2$. Find the domain, range and give the equations of any asymptotes.

2. Solve for x :

a. $\left(\frac{1}{81}\right)^{3x-2} = 27^{2x-1}$

b. $2^{x^2} = (16^{x-1})(2^x)$

3. Graph $y = \log_3 x$ and $y = \log_3(x+3) - 1$. Find the domain, range and give the equations of any asymptotes.

4. Find the value of x :

a. $\log_{125} x = \frac{2}{3}$

b. $\log_9 \frac{1}{81} = x$

c. $\log_9 \frac{1}{27} = x$

d. $\log_x 8 = \frac{3}{4}$

e. $6^{\log x} = \frac{1}{36}$

f. $\log_4 8^x = 8$

5. Solve:

a. $2 \log m + 3 \log m = 10$

b. $\log_2(2m+4) - \log_2(m-1) = 3$

6. The point $(1024, 5)$ goes through the function $y = \log_a x$. What is a ?

7. Solve to three decimal places: $8^{5x-2} = 69$.

8. The half-life of a substance is 23 days. How long will it be until the amount remaining is 10% of the initial amount?

9. Two earthquakes measure 7.7 and 6.3 on the Richter scale. How many times more powerful is the first than the second?

10. Simplify: $3^{2 \log_3(2x+1)}$.

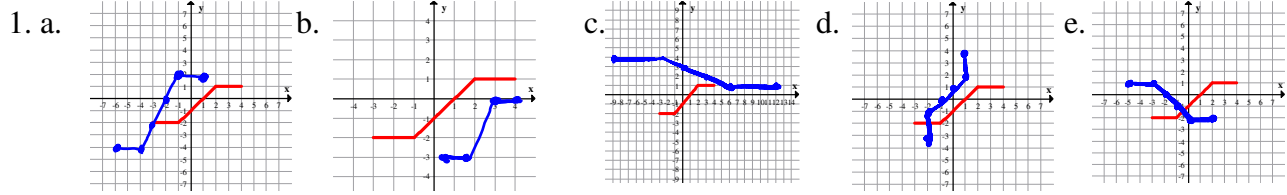
11. If $\log_3 x = 2$ and $\log_3 y = 5$, find:

a. $\log_3(9x^2y)$

b. $\log_9\left(\frac{3x^2}{y}\right)$

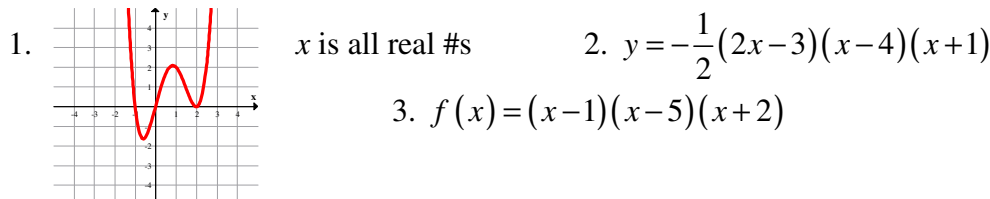
Answer Key: (For FULL solutions, please look online.)

Ch 1



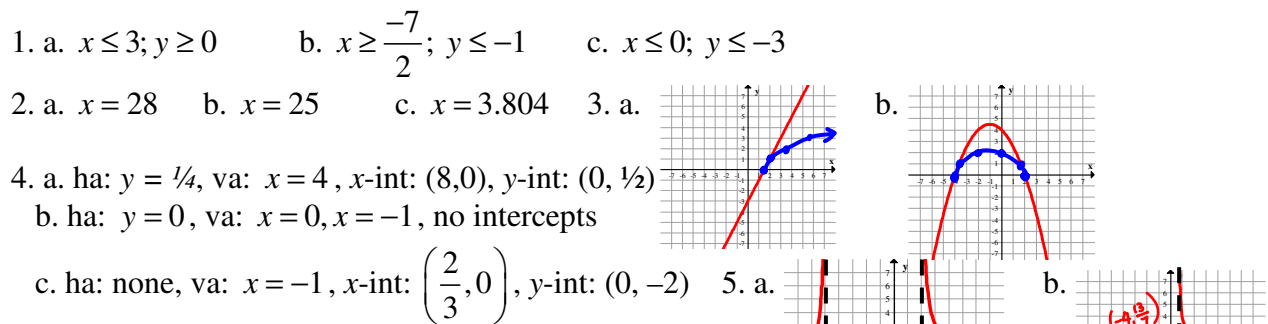
2. a. $y = -2x^2 + x - 3$ b. $y = 2x^2 + x + 3$
3. a. $(-2, 0)$ b. $(4, -1)$ c. $(3, -1)$ d. $(4, -5)$ 4. a. $y = 2x - 2$ b. $y = \frac{1}{x} - \frac{3}{2}$
5. a. $y = 2x^2 + 4x + 4$ b. $y = 2x^2 - 2x + 2$ c. 19 d. 39 e. 55 f. $6x^2 + 3x + 10$

Ch2



4. a. $x = -1, \frac{3}{2}, 2$ b. $x = -1, -\frac{1}{2}, 4$ c. $x = -3, -1, \frac{1}{2}$
5. a. $x \leq -3$, or $0 \leq x \leq \frac{5}{2}$ b. $-3 \leq x \leq 3$ 6. a. $f(-2) = -4$ 7. $k = -5$
8. a. $3x^2 - 13x + 54 - \frac{212}{x+4}$ b. $x^3 - x^2 + \frac{7}{x+1}$ 9. $x = 3\text{cm}$ or 1.67cm

Ch3



Ch4

