Basic Skills to Review for Math 10 Foundations and Pre-Calculus Final Exam (Solutions)

From Chapter 2

1) Solve for x. (Pythagorean Theorem)
   x= 15.6 x = 9.8

2) Solve for x. (Using Sin, Cos, Tan Ratios)
   x = 20 Sin 35
   x = 11.5

   x = 10 Cos 55
   x = 5.7

   x = 12 ÷ Tan 40
   x = 14.3

   ∠A = 37°
   ∠B = 53°

From Chapter 3

1) Multiply.
   a) $(x + 4)(x + 6) = x^2 + 10x + 24$
   b) $(2x – 3)(x + 5) = 2x^2 + 7x – 15$
   c) $(x + 4)(x^2 + 2x – 3) = x^3 + 2x^2 – 3x + 4x^2 + 8x – 12 = x^3 + 6x^2 + 5x – 12$

2) Factor.
   a) $3x – 6 = 3(x – 2)$
   b) $-5x + 10 = -5(x – 2)$
   c) $x^2 – 100 = (x + 10)(x – 10)$
   d) $4x^2 – 49 = (2x + 7)(2x – 7)$
   e) $x^2 + 8x + 12 = (x + 6)(x + 2)$
   f) $y^2 – 3y – 18 = (y – 6)(y + 3)$
   g) $6x^2 + 13x – 5 = (2x + 5)(3x – 1)$
   h) $3x^2 – 27 = 3(x^2 – 9) = 3(x + 3)(x – 3)$

#2g) Work

$6x^2$	
	-5

Find 2 numbers that **multiply to get -30** and **add to get +13**.

$6x^2$	**15x**
-2x	-5

Now find the GCF of the 2 rows and 2 columns

	2x	**+5**
3x	$6x^2$	15
-1	-2x	-5

From Chapter 4

1) Simplify the following radicals.
   $\sqrt{50} = 5\sqrt{2}$ $\sqrt{200} = 10\sqrt{2}$ $\sqrt{64} = 8$

   $\sqrt[3]{80} = 2\sqrt[3]{10}$ $\sqrt[3]{128} = 4\sqrt[3]{2}$ $\sqrt[4]{80} = 2\sqrt[4]{5}$

2) Rewrite as an entire radical.

   $2\sqrt{5} = \sqrt{20}$ $4\sqrt[3]{3} = \sqrt[3]{192}$

3) Evaluate (without using a calculator).

$4^{\frac{3}{2}} = \left(\sqrt{4}\right)^3 = 2^3 = 8$ $\quad 8^{\frac{4}{3}} = \left(\sqrt[3]{8}\right)^4 = 2^4 = 16$ $\quad (-16)^{\frac{3}{2}} = \left(\sqrt{-16}\right)^3$ = impossible

$\left(\frac{1}{8}\right)^{-\frac{1}{3}} = 8^{\frac{1}{3}} = \sqrt[3]{8} = 2$ $\quad 4^{-\frac{3}{2}} = \left(\frac{1}{4}\right)^{\frac{3}{2}} = \left(\sqrt{\frac{1}{4}}\right)^3 = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$ $\quad 16^{.75} = 16^{\frac{3}{4}} = \left(\sqrt[4]{16}\right)^3 = 8$

4) Express each radical as a power.

$\left(\sqrt[3]{4}\right)^5 = 4^{\frac{5}{3}}$ $\qquad \sqrt{5.5} = (5.5)^{\frac{1}{2}}$

5) Simplify the following. Write all powers with positive exponents.

$\frac{x^2y^3}{xy^5} = \frac{x}{y^2}$ $\qquad \left(x^{-2}y^3\right)\left(x^4y^{-1}\right) = x^2y^2$ $\qquad \left(\frac{x^2}{x^4}\right)^{-3} = \left(x^{-2}\right)^{-3} = x^6$

<u>From Chapter 5</u>

1) Write the Domain and Range for each of these relations.
   a) {(0,3) (1,4) (2, 5)}
      Domain: {0, 1, 2} Range: {3, 4,5}

   b) Domain: $-3 \le x \le 4$
      Range: $0 \le y \le 2$

2) Is the relation a function (yes or no)? no (x value of 2 is used more than once)

3) Is the function a linear relation (yes or no)?
   a) {(0, 30) (1, 20) (2, 10) (3, 0)} yes…constant rate of change
   b) {(1, 1) (2, 2) (3, 4) (4, 7) (5, 11)} no…rate of change is different

4) What is the rate of change for each linear relation below?
   a) {(2, 10) (4, 20) (6, 30)} rate of change is $\frac{10}{2} = 5$
   b) rate of change is $-\frac{3}{1} = -3$

5) If the function is f(x) = 2x + 4, find f(3).
   f(3) = 2(3) + 4 = 10

From Chapter 6

1) What is the slope of the line y = 2x + 3? Slope is 2

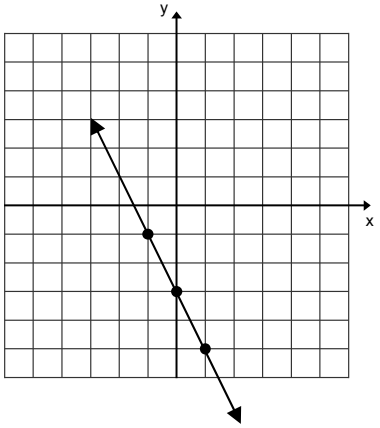
2) What is the slope of the following graph? Slope is $-\frac{5}{2}$

3) What is the slope of the line that passes through the points (3, 6) and (-1, 4)?

Slope = $\frac{6-4}{3-^{-}1} = \frac{2}{4} = \frac{1}{2}$

4) Graph the line 2x + y = -3.

y = -2x – 3
m = -2 (Slope)
b = -3 (y-intercept)



5) Identify the slope and the coordinates of a point on the line of the equation
y + 5 = -2(x – 4).
Slope is -2 Point is (4, -5)

6) Write an equation in the form $y - y_1 = m(x - x_1)$ (slope/point form) for the graph of a linear function that passes through the points (1, 4) and (3, 7).

Slope = $\frac{4-7}{1-3} = \frac{-3}{-2} = \frac{3}{2}$ $y - 4 = \frac{3}{2}(x - 1)$ OR $y - 7 = \frac{3}{2}(x - 3)$

7) Write the equation of the line in the form y = mx + b (slope/intercept form) that has a y-intercept of 5 and is perpendicular to the line with an equation y = 2x + 3.

Slope is $-\frac{1}{2}$ (perpendicular = use neg reciprocal of 2) $y = -\frac{1}{2}x + 5$

8) Rewrite the equation 3x + 2y – 6 = 0 into the form y = mx + b (slope/intercept form).

2y = -3x + 6
$y = -\frac{3}{2}x + \frac{6}{2}$ $y = -\frac{3}{2}x + 3$

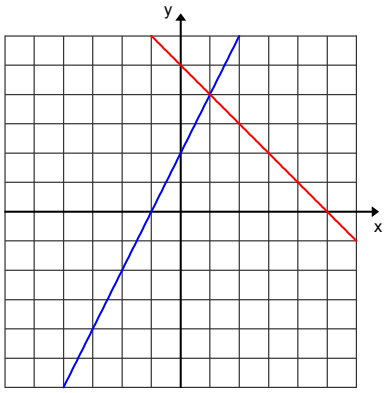
From Chapter 7

1) Is the point (2,3) a solution to the system below? (Why or why not?)

$3x - 2y = 0$ yes it is. $3(2) - 2(3) = 0$
$x = y - 1$ $2 = 3 - 1$ Works in both!

2) Solve the following system using the **Graphic Method**.

$y = 2x + 2$ $y = 2x + 2$
$x + y = 5$ $y = -1x + 5$



Solution is (1, 4)

3) Solve the following system using the **Substitution Method**.

$2x + 3y = 11$
$y = 2x + 1$

$2x + 3(2x + 1) = 11$ $y = 2(1) + 1$
$2x + 6x + 3 = 11$ $y = 3$
$8x + 3 = 11$
$8x = 8$ Solution is (1, 3)
$x = 1$

4) Solve the following system using the **Elimination Method**.

$3x + 2y = 1$ $3x + 2y = 1$ $3x + 2(2) = 1$
$x - 3y = -7$ $x(-3)$ $-3x + 9y = 21$ $3x + 4 = 1$
$11y = 22$ $3x = -3$ Solution (-1, 2)
$y = 2$ $x = -1$

5) How many solutions (none, infinite, one) does the system have?

a) $y = 2x + 3$ None (same slope, diff y-int)
$y = 2x - 3$

b) $-2x + y = 4$ $y = 2x + 4$
$4x - 2y = -8$
$-2y = -4x - 8$
$y = 2x + 4$ Infinite (both have same slope and y-int)

6) w = width $2w + 2l = 150$ a = adult tickets $2a + 3c = 35$
l = length $l = 2w$ c = child tickets $4a + 1c = 45$