

# HOMEWORK 3 - MATH 111

DUE DATE: Monday, October 3

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Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Sketch a graph of a function that has a negative  $y$ -intercept, but rises to positive values, reaches a peak and, then, slopes downward but never reaches zero.
2. Solve the following equations:

(a)  $25 = \frac{20}{x}$

(b)  $8 = \frac{15}{x-2} + 3$

(c)  $80 = \frac{120}{x+1} + 32$

3. Solve the system

$$\begin{cases} 40 = \frac{x}{4} + y \\ 37 = \frac{x}{5} + y \end{cases}$$

4. Consider the graph of  $f(x) = \frac{1}{x}$ . Perform the following transformations: Flip the graph with respect to the  $x$  axis and, then move it 2 points to the left and 3 points upward. Draw the old graph, the new graph and find an equation for the function  $y = g(x)$  whose graph is the new graph.
5. The gas laws in physics say that the pressure  $P$  inside an air tight vessel is inversely proportional to the volume  $V$  of the vessel as the volume of the vessel is altered by the movement of a plunger. (See Figure 4.33 on page 265.)
  - (a) Write an equation for  $P$  in terms of  $V$  that expresses this general idea.
  - (b) Suppose that the volume of the cylinder is 1.5 liters when the pressure is 1 atmosphere. Write an equation to describe the pressure that would result from any particular volume of the cylinder.

6. Find the formula that is asked for and simplify your answer:

(a) If  $f(x) = \frac{2}{x+3} + 5$ , what is  $5f(x-2)$ ?

(b) If  $f(x) = \frac{-1}{x} - 10$ , what is  $\frac{f(\frac{1}{x})}{x}$ ?

7. Find the values for  $a, b$  if the graph of  $f(x) = \frac{a}{x} - b$  passes through the points  $(6, 2), (10, -2)$ .
8. Consider the function having the equation  $y = 3x - 2$ .
  - (a) What is the slope-intercept form of its graph, when the graph is shifted downwards 6 units?
  - (b) What is the slope-intercept form of this graph, shifted to the right 2 units?