

Assignment mark: ____/____

Assignment quiz mark: ____/____

This assignment is due on **October 22, 2012**.

Goals:

- 1) To practice the art of communicating a written solution to a math problem. You must clearly present the key concepts and the logical sequence of steps taken to arrive at a solution. Just answers are not good enough! Illustrations of solutions by graphing or drawing diagrams are often part of your presentation.
- 2) To encourage the use of the math textbook as a resource for you to learn from and get explanations of concepts and sample solutions.
- 3) To encourage a dialog between students of concepts and processes to achieve solutions to mathematical problems.

Format requirements:

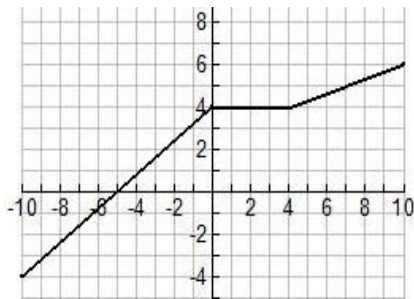
This assignment will be graded so you must show at least one (most of these questions require many more than one) step of work for each question. If I cannot see clearly what you have done I cannot give you the marks. There is only one accepted format for this and all future assignments.

- 1) You will choose **3 of the 5** given questions to complete. (It is still to your advantage, however, to know how all of them are done.) All questions are worth the same number of marks. The questions must be in the same order that they are presented to you. If you do more than 3 questions, only the first 3 will be marked.
- 2) Each step
for each question
must be
on the next line
down, not to the right.
- 3) Students are encouraged to help each other with understanding the assignments but must submit their own work.
- 4) Any explanations must be done in complete sentences with proper mathematical notation as necessary.

Copied assignments will not be marked.

Questions:

1. For the graph of $y = f(x)$ shown, draw the graph after the transformations indicated, labeling (giving coordinates of) at least 3 points on the graph.



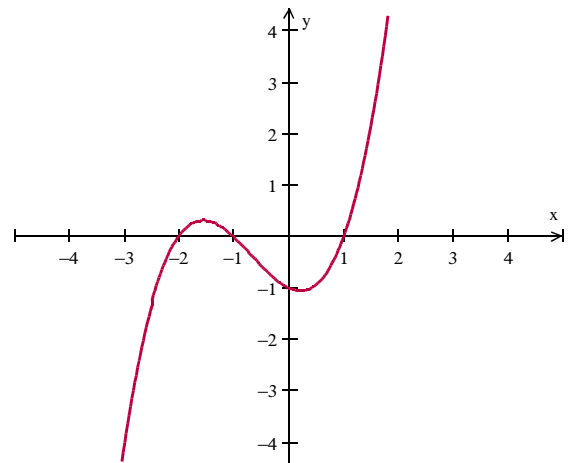
a) $y = \frac{1}{2}[f(x) - 4]$

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

c) $\frac{y+3}{2} = f(3-x)$

2. The graph shown is the graph of $y = -\frac{1}{3}f\left(\frac{3}{2}x + 6\right) - 2$.

Give the transformations needed (in order) to get back the original graph of $y = f(x)$. Draw the graph of $y = f(x)$.



3. The function $y = f(x)$ has been transformed to $y = \frac{3}{2}f^{-1}(-2x+6) - 1$.
- Find the coordinates of a point on the transformed function if (a, b) is a point on the graph of $y = f(x)$.
 - Choose either $y = x^2$, $y = \sqrt{x}$ or $y = \frac{1}{x}$ and draw the graph of the function after the transformations.

4. The acceleration of an object of constant mass is a function of the force acting on it: $a(F) = \frac{F}{m}$. If the force occurs due to a collision, the force that acts on the object in a certain time period is a function of the impulse transferred to the object: $F(\Delta p) = \frac{\Delta p}{t}$. Impulse as a function of velocity is: $\Delta p(\Delta v) = m\Delta v$. Use function composition to find acceleration as a function of velocity and time and show that this is equivalent to the classical definition of acceleration.

- 5.
- Determine a simplified formula for the ratio of a cylinder's surface area to its volume.
 - What is the ratio of SA to V as a function of the radius if the cylinder's height is double its radius?
 - For the cylinder in (b), what conditions must the radius and height satisfy for the numerical value of the surface area to be larger than the value of the volume?