



2. Given the equation  $4x + 3y = -2$

(a) (3 points) Find the slope of the line represented by this equation.

(b) (4 points) Find the  $x$  and  $y$  intercepts for this line.

(c) (3 points) Give an equation for the line that passes through the origin and is parallel to this line.

3. Given the function

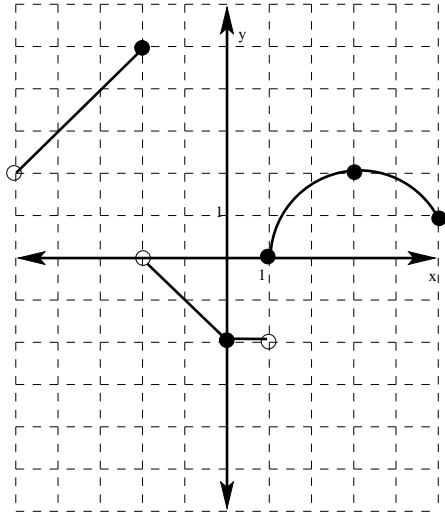
$$f(x) = \begin{cases} -x & \text{if } x < 1 \\ 0 & \text{if } x = 1 \\ 2x - 1 & \text{if } x > 1 \end{cases}$$

(a) (8 points) Graph  $f(x)$ .

(b) (6 points) Find the domain and range of  $f(x)$ . Give your answer in interval notation.

4. Suppose you own a company that manufactures widgets. Your supplier sells you the widgets wholesale at \$8 apiece. It costs you \$750 a month to rent your store, and you spend an additional \$2150 each month on utilities, supplies, and employee salaries. You sell the widgets at a retail price of \$15 apiece.
- (a) (3 points) Find an equation  $C(x)$  that gives your monthly costs, where  $x$  is the number of widgets you purchase for sale that month.
- (b) (5 points) Find equations for your monthly revenue,  $R(x)$ , and your monthly profits,  $P(x)$ , assuming that you sell all of the new widgets that you purchase.
- (c) (4 points) How many widgets do you need to sell each month in order to break even?
5. (8 points) Suppose that the supply and demand for a product are given by the equations  $2p + 3x = 90$  and  $4p - 2x = 100$ , where  $x$  is the quantity sold, in thousands, and  $p$  is the price in dollars. Find the equilibrium price for this product, and the quantity sold at this price.

6. (2 points each) For the given graph of  $f(x)$ , find the following:



(a)  $f(0)$  and  $f(3)$

(b)  $x$ , if  $f(x) = 1$

(c) The domain of  $f$

(d) The range of  $f$

(e) The intervals where  $f$  is increasing.

7. (8 points) Find the values of  $x$  that satisfy the inequality  $2x^2 + 3x - 2 > 0$ . Graph your solution on a number line.

8. Given that  $f(x) = \sqrt{2x - 2}$  and  $g(x) = \frac{4}{3x - 2}$

(a) (4 points) Find  $g(6)$  and  $f(3a + 1)$

(b) (3 points) Find  $\frac{g}{f}(3)$

(c) (3 points) Find  $f \circ g(2)$

9. Given that  $f(x) = \sqrt{3x - 2}$  and  $g(x) = x^2 - 4$

(a) (4 points) Find  $g \circ f(x)$

(b) (5 points) Find the domain of  $\frac{f}{g}$ ? Give your answer in interval notation.

(c) (5 points) Find  $\frac{g(a + h) - g(a)}{h}$ . Simplify your answer.