

**Week-In-Review #1**

1. Which of the following are functions?

(a)  $x^2 + y^2 = 10$

(b)  $y = x^2 - 8$

(c)  $y = \frac{1}{\sqrt{x+1}}$

2. If  $f(x) = 2x^2 - x$ , find

(a)  $f(-1)$

(b)  $f(\sqrt{3})$

(c)  $f(*)$

(d)  $f(a + b)$

(e)  $f(x + h)$

(f)  $\frac{f(x + h) - f(x)}{h}$

3. Find the domain of the following functions. Express your answer using interval notation.

(a)  $f(x) = x^{10} + 2x^5 - \pi x + 7$

(b)  $g(x) = \frac{2x + 5}{x^2 - 6x - 16}$

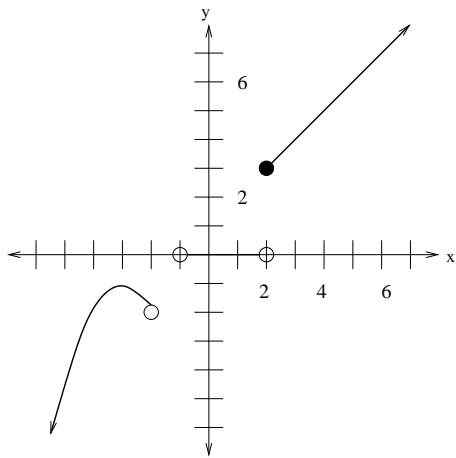
(c)  $h(x) = \sqrt{6 - x}$

(d)  $m(x) = |x + 2|$

(e)  $n(x) = 5(2x + 1)^{-1/3}$

(f)  $r(x) = \begin{cases} x + 1 & , x < -2 \\ x & , x > 1 \end{cases}$

(g)

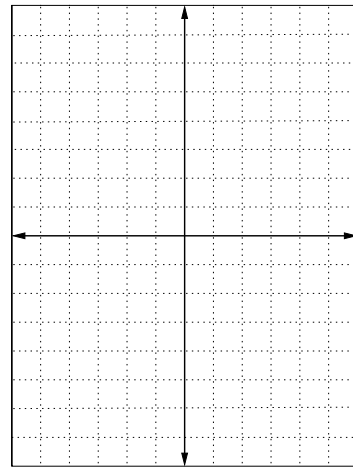


4. If  $f(x) = x^3$  and  $g(x) = -3(x - 2)^3 + 4$ , how was  $f(x)$  transformed to get  $g(x)$ ?

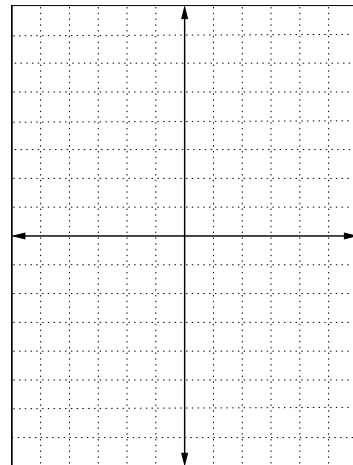
5. If  $f(x) = |x|$  and  $g(x) = 0.5|x + 5| - 3$ , how was  $f(x)$  transformed to get  $g(x)$ ?

6. Make an accurate graph of the following:

$$(a) f(x) = \begin{cases} x & , x \leq -2 \\ x^2 + 1 & , -2 < x < 1 \\ 1 & , x > 3 \end{cases}$$



$$(b) g(x) = \begin{cases} 2x + 4 & , x < 0 \\ 4 & , x \geq 0 \end{cases}$$



7. You are moving across the country for a new job and find out that the moving companies charge approximately \$2 per pound of stuff to be moved. A perk of your new job is that your new employer will pay all or part of this moving expense, dependent upon how much stuff you have to move. Your new company will pay 100% of this cost for the first 5000 lbs to move. They will pay 75% of the next 5000 lbs, and they will not pay for additional costs associated with any weight over 10000 lbs to be moved. If  $x$  represents the number of pounds of stuff you have to move, find a piecewise function describing *your* moving expenses.

8. Find the slope of the line passing through the points  $(c, d + 2)$  and  $(c + 3, d - 4)$ .

9. Give the equation of a line having an  $x$ -intercept at  $-1$

(a) and passing through the point  $(2,3)$ .

(b) that is vertical.

(c) that is horizontal.

(d) Are all of the equations of lines in (a)-(c) representative of functions?

10. A computer bought in Jan. 2000 for \$1500 is worth \$900 in Jan. 2002.

(a) Assuming the computer's value depreciates at a constant rate, find the value of the computer as a function of the number of months since it was purchased.

(b) What will the computer be worth in Jan. 2004?

11. KB and Co. produces cabinets. It costs KB and Co. a total of \$400 to produce 10 cabinets. It can sell a total of 15 cabinets when they are priced at \$85 each and 20 cabinets if the price is reduced to \$60 per cabinet. If KB and Co. decides not to produce any cabinets, they will still have costs totaling \$200. Find

(a) the linear price-demand function.

(b) the cost function.

(c) the revenue function.

(d) the profit function.

(e) the break-even point(s) and, therefore, over which intervals KB and Co. will realize a profit gain or loss.

(f) the profit/loss from selling 10 cabinets.

12. The price-demand and price-supply equations for a particular brand of fingernail polish are found to be  $p = -3x + 12$  and  $p = 2x + 5$ , respectively. Find the equilibrium point for the market, if  $x$  is given in thousands of bottles of fingernail polish and  $p$  is given in dollars.

13. The annual sales (in millions of \$) for MathCo. are given below, where  $x =$  the number of years since 1990

Year, $x$	0	1	2	3	4
Sales, $y$	5.8	6.2	7.2	8.4	9

- (a) Find the equation of the best fitting line to the data (Round each coefficient to four decimal places, if necessary.)
- (b) Assuming the trend continues, use your unrounded model to predict the sales (to the nearest cent) in 1999.
- (c) Assuming the trend continues, use your unrounded model to predict the year in which the sales would first exceed \$15,000,000.