

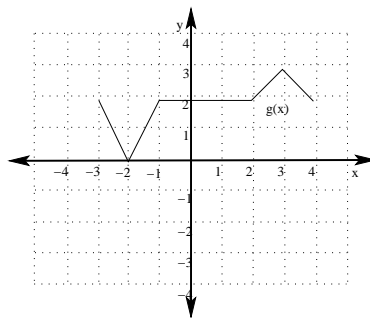
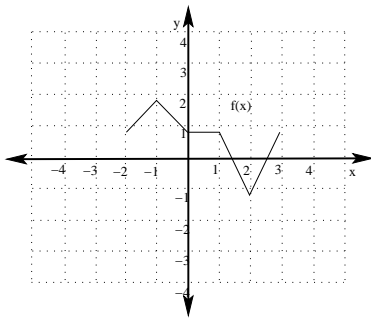
1. True or False:
  - (a) Any two distinct points in the plane determine exactly one line.
  - (b) Any line can be written in the form  $y = mx + b$ .
  - (c) The graph of any circle is symmetric with respect to the origin.
  - (d) If a graph has two points with the same  $y$ -coordinate, then it is not the graph of a function  $y = f(x)$ .
  - (e) Every function  $y = f(x)$  has at least one  $x$ -intercept.

2. Given the points  $A(2, -2)$  and  $B(-1, 4)$ :
  - (a) Find  $d(A, B)$
  - (b) Find the midpoint of the line segment containing  $A$  and  $B$ .
  - (c) Find the equation for the line containing  $A$  and  $B$  in general form.
  - (d) Find the equation for the circle centered at  $B$  containing the point  $A$ .
  - (e) Find an equation for the vertical line containing  $B$ .
  - (f) Find an equation for the horizontal line containing  $A$ .

3. Find the equation for each line described below. Put your final answer in slope/intercept form.
  - (a) The line with slope 4 and  $y$ -intercept -7
  - (b) The line containing the points  $(-4, 1)$  and  $(3, -7)$
  - (c) The line parallel to the line  $3x - 4y = 12$  passing through the point  $(1, 3)$
  - (d) The line perpendicular to the line  $5y - 2x = 3$  and having  $x$ -intercept -1.

4. A 16oz jar of peanut butter cost \$1.78 in 1995. In 2005, a similar jar cost \$2.99.
  - (a) Find a line that models the price of peanut butter over time (hint: you can take  $x = 0$  to represent 1995)
  - (b) Use your model to predict the price of peanut butter in 2010.
  - (c) According to your model, when will the price of peanut butter reach \$5.00 for a 16oz jar?

5. Given the graphs of  $f(x)$  and  $g(x)$  shown below, use graph transformations to graph each of the following. Label at least 3 points in your final graph.



- |                 |                        |                  |
|-----------------|------------------------|------------------|
| (a) $f(x) + 3$  | (d) $g(2x)$            | (g) $-f(-x) - 1$ |
| (b) $g(x - 2)$  | (e) $f(-x) + 1$        |                  |
| (c) $2f(x) - 1$ | (f) $-\frac{1}{2}g(x)$ | (h) $-2g(x + 1)$ |

6. Find the equation for the each of the following circles. Then graph the circle.
  - (a) The circle with center  $(4, -5)$  and radius 6
  - (b) The circle with a diameter passing through the points  $(2, -2)$  and  $(-4, -2)$
  - (c) The circle with center  $(2, 1)$  and passing through the point  $(5, 5)$

7. Graph the circle with equation  $x^2 + y^2 + 4x - 6y - 3 = 0$

8. Find the domain of the following functions (put your answers in interval notation):

(a)  $f(x) = \frac{x^2+x-2}{x^2-4}$

(b)  $f(x) = \frac{\sqrt{4-2x}}{x^2-1}$

(c)  $f(x) = \frac{4}{\sqrt{3x-5}}$

(d)  $f(x) = \frac{\sqrt{3-2x}}{2x^2+x-15}$

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

(a) Find  $\frac{g}{f}(3)$

(b) Find  $f \circ g(2)$

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

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

(b) Find  $f \circ g(x)$

(c) Find the domain of  $g \circ f(x)$ . Give your answer in interval notation.

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

11. An oil well off the Gulf Coast is leaking, with the leak spreading oil over the surface in the shape of a circle. At any time  $t$ , in minutes, after the beginning of the leak, the radius of the circular oil slick on the surface is  $r(t) = 4t$  feet. Let  $A(r) = \pi r^2$  represent the area of the circle of radius  $r$ .

(a) Find  $(A \circ r)(t)$

(b) Explain what  $(A \circ r)(t)$  is in practical terms.

12. Given the tables below, find the following:

x	0	2	4	6	8
f(x)	1	5	8	4	0

x	0	2	4	6	8
g(x)	2	6	5	9	7

(a)  $\left(\frac{f}{g}\right)(8)$

(b)  $(f \circ g)(2)$

(c)  $(g \circ g)(2)$

(d)  $f^{-1}(5)$

(e)  $f(g^{-1}(9))$

13. Determine whether or not the following functions are one-to-one. You must justify your answer to each part.

(a)  $f(x) = 3x - 5$

(b)  $f(x) = x^3 - x$

(c)  $f(x) = 3|x| - 2$

(d)  $g(x) = -\frac{1}{2x}$

14. Use algebra to find the inverse of each of the following functions:

(a)  $f(x) = 5x - 4$

(b)  $f(x) = \sqrt{x-4}$

(c)  $f(x) = \frac{5x}{3-x}$

(d)  $f(x) = \frac{2x-3}{3x+4}$