

1. Solve the following inequalities. Express your answer in interval notation.

(a)  $15 \leq -5x$

(c)  $-7 < 3x - 4 \leq 5$

(b)  $.3x - .2(3x + 1) < 1$

(d)  $2x - 5 \leq 5x - 2 \leq 2x + 7$

2. Determine whether or not the following equations are symmetric with respect to the  $x$ -axis,  $y$ -axis, or the origin.

(a)  $y = x^4 - x^2$

(c)  $x^2 - y^2 = 1$

(b)  $y = x^3 - 2x$

(d)  $y = 3x - 2$

3. Sketch the graphs of the following functions. Be sure to find and label all  $x$  and  $y$  intercepts.

(a)  $y = 3x - 2$

(f)  $y = 4 - x^2$

(b)  $y = 4 - x^2$

(g)  $f(x) = \begin{cases} x - 2 & \text{if } x \leq 4 \\ 2x - 6 & \text{if } x > 4 \end{cases}$

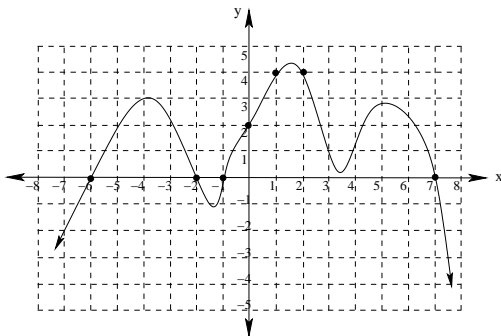
(c)  $f(x) = -\frac{3}{4}x + 2$

(h)  $f(x) = \begin{cases} 3x - 2 & \text{if } x < 1 \\ 4 & \text{if } x = 1 \\ x^2 - 1 & \text{if } x > 1 \end{cases}$

(d)  $g(x) = x^3 - 4x$

(e)  $y = \sqrt{x - 4}$

4. Based on the graph given below:

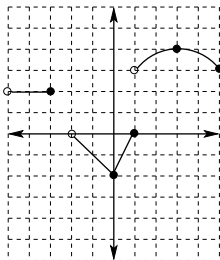


(a) Find the coordinates of all  $x$  intercepts.

(b) Find the coordinates of all  $y$  intercepts.

(c) Find the  $x$ -value(s) when  $y = 4$

5. For the given graph of  $f(x)$ , find the following:



(a)  $f(0)$

(d) The domain of  $f$

(b)  $f(3)$

(e) The range of  $f$

(c)  $x$ , when  $f(x) = 2$

(f) The intervals where  $f$  is decreasing.

6. Let  $f(x) = x^2 - 2x$ . Find and simplify the following:

(a)  $f(2)$ , and  $f(\frac{2}{3})$

(c)  $f(2a - 1)$

(b)  $f(a + 3)$

(d)  $\frac{f(a + h) - f(a)}{h}$

7. Determine whether or not the following are functions:

(a)  $\{(3, 4), (5, 7), (2, -1), (6, 8), (8, 6)\}$  (b)  $\{(1, 2), (3, 7), (4, -12), (5, 8), (7, 2)\}$  (c)  $\{(1, 2), (2, 3), (3, 4), (4, 5), (3, 5)\}$

8. Given the points  $A(2, -2)$  and  $B(-1, 4)$ :

- Find  $d(A, B)$
- Find the midpoint of the line segment containing  $A$  and  $B$ .
- Find the equation for the line containing  $A$  and  $B$  in general form.
- Find the equation for the circle centered at  $B$  containing the point  $A$ .
- Find an equation for the vertical line containing  $B$ .
- Find an equation for the horizontal line containing  $A$ .

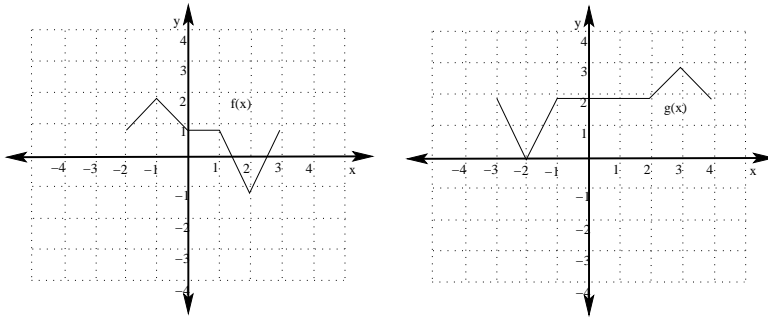
9. Find the equation for each line described below. Put your final answer in slope/intercept form.

- The line containing the points  $(-4, 1)$  and  $(3, -7)$
- The line parallel to the line  $3x - 4y = 12$  passing through the point  $(1, 3)$
- The line perpendicular to the line  $5y - 2x = 3$  and having  $x$ -intercept  $-1$ .

10. A 16oz jar of peanut butter cost \$1.78 in 1995. In 2005, a similar jar cost \$2.99.

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

11. 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) $-2g(x + 1)$ |

12. Find the equation for the each of the following circles. Then graph the circle.

- The circle with center  $(4, -5)$  and radius 6
- The circle with center  $(2, 1)$  and passing through the point  $(5, 5)$

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

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

- |  |  |
|--|--|
| (a) $f(x) = \frac{x^2 + x - 2}{x^2 - 4}$   | (c) $f(x) = \frac{4}{\sqrt{3x - 5}}$             |
| (b) $f(x) = \frac{\sqrt{4 - 2x}}{x^2 - 1}$ | (d) $f(x) = \frac{\sqrt{3 - 2x}}{2x^2 + x - 15}$ |

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

- |                           |  |
|---------------------------|--|
| (a) Find $\frac{g}{f}(3)$ | (e) Find the domain of $g \circ f(x)$ . Give your answer in interval notation. |
| (b) Find $f \circ g(2)$   |  |
| (c) Find $g \circ f(x)$   | (f) Find the domain of $\frac{f}{g}$ . Give your answer in interval notation.  |
| (d) Find $f \circ g(x)$   |  |

16. 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  $r$ .

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