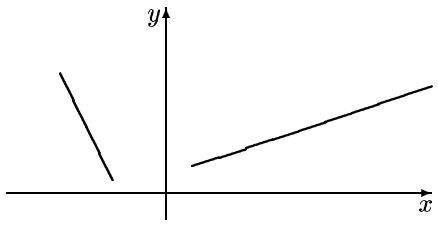
Function Problems

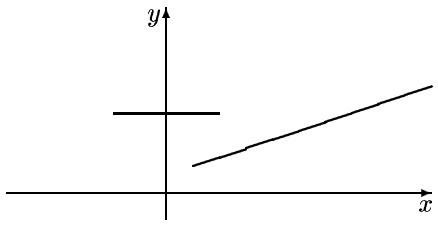
Math 130 *Kovitz*

1. Find the domain and range of the function $f(x) = \sqrt{x - 29} + 3$.
2. Find the domain and range of the function $f(x) = \sqrt{x + 1} + 1$.
   Find the value of f when $x = 0$; and find all x (if any) for which $f(x) = 0$.
   Find all a for which $f(a) = a$. Check all answers.
3. Is each relation a function? Why or why not?

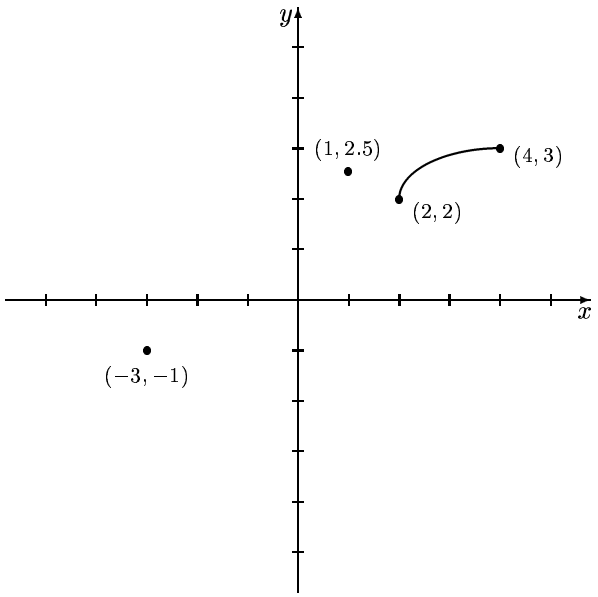
(a)



(b)



4. The following is the entire graph of a function f:



   (a) Find $f(-3)$ and $f(0)$.

   (b) For which a does $f(x) = a$ have more than one solution?

   (c) Estimate $f(3.5)$

   (d) Estimate the x for which $f(x) = 2.75$.

   (e) Mark on the *graph* the point or points where $y = 2.5$ and $y = 2.2$.

   (f) Find the domain and the range.

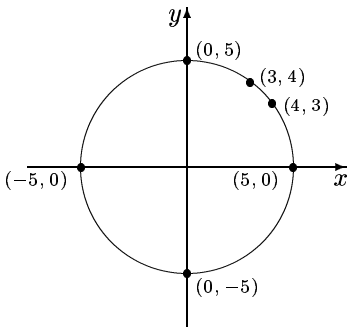
5. For the given function $f(x) = x^2 - 3x$, evaluate $f(x + 1)$.
6. For the given function $f(x) = x^2 - x$, evaluate $f(x - 1)$.
7. For the given function $H(x) = x^2 + 2x$, evaluate
   (a) $H(x + 1)$.
   (b) $H(x) + H(1)$.
8. Let f be the function with the rule $f(x) = x^2 - 11x + 1$.
   (a) Find $f(0)$, $f(7)$, and $f(-2)$.
   (b) Find $\dfrac{f(3 + h) - f(3)}{h}$, assuming that $h \neq 0$.

   (This will be an expression for the slope of the secant line connecting the points on the graph for $x = 3$ and $x = 3 + h$. It will also represent the average rate of change of the function from the point where $x = 3$ to the point where $x = 3 + h$.)

9. In each part, sketch the graph by transforming the graph of $x^2 + y^2 = 25$, pictured here. The relation $x^2 + y^2 = 25$ is called the parent relation.

   (a) $(x + 2)^2 + (y - 6)^2 = 25$

   (b) $(5x)^2 + (\frac{y}{6})^2 = 25$

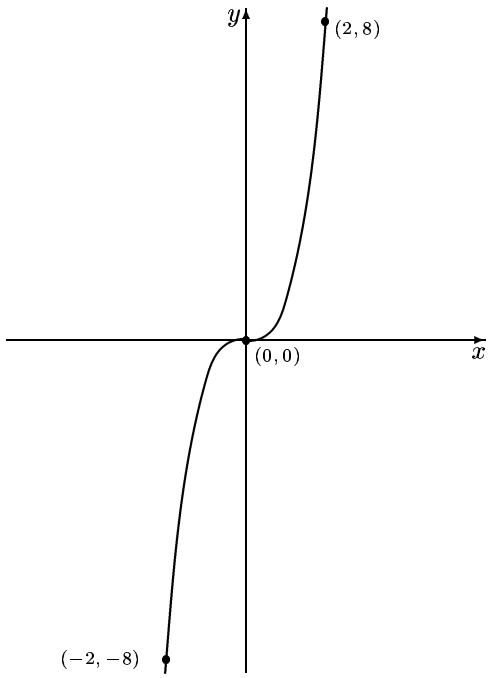


10. In each part, sketch the graph by transforming the graph of $y = x^3$, pictured here. The function $y = x^3$ is called the parent function.

    (a) $y = (x + 3)^3$

    (b) $y + 8 = x^3$

    (c) $y/11 = x^3$



11. In each part, decide whether the function f with the given rule is even, odd, or neither.

    (a) $f(x) = 4x^6$

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

    (c) $f(x) = \sqrt[5]{x}(x^2 + 6x^8)$

    (d) $f(x) = \dfrac{x^4 + 1}{x^3 - x}$