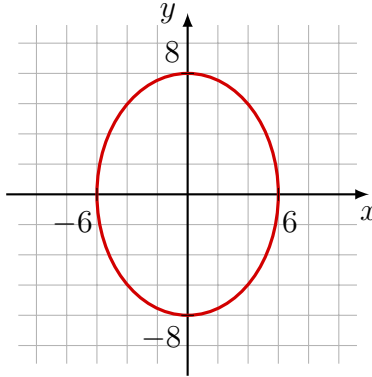


MATH 120  
WINTER 2015  
EXAM 3

NAME:

1. 10 pts. Write an equation in slope-intercept form for the line through  $(-2, -7)$  and parallel to  $3x - 4y = 2$ .
2. 10 pts. Write an equation in slope-intercept form for the line through  $(2, -4)$  and perpendicular to  $8x - 3y = 6$ .

3. 10 pts. Give the domain and range of the relation given by the graph below. Is the relation a function?



4. 10 pts. Let  $f(x) = x^2 - \sqrt{x}$ . Find  $f(9)$  and  $f(c)$ .
5. 10 pts. each Find the domain and range of each function.
  - (a)  $y = x^5$
  - (b)  $y = |x| + 14$
6. 10 pts. each Find the domain of each function (not the range).
  - (a)  $\alpha(x) = \frac{x+1}{3x-2}$
  - (b)  $\beta(x) = \sqrt{x-5}$
  - (c)  $\gamma(x) = \sqrt{64-x^2}$
7. 10 pts. each Refer to the functions  $\alpha, \beta, \gamma$  in Problem 6. There is no need to simplify any of your expressions, but domains must be explicit.
  - (a) Find  $\alpha + \gamma$  and its domain.
  - (b) Find  $\alpha/\beta$  and its domain.
  - (c) Find  $\beta \circ \beta$  and its domain.
  - (d) Find  $\beta \circ \gamma$  and its domain.

8. 10 pts. Let  $H(x) = \frac{18}{(7-2x)^{10}}$ . Find functions  $f$  and  $g$  such that  $f \circ g = H$ .
9. 10 pts. Show the function  $f(x) = -3x^5 + 6$  is one-to-one.
10. 10 pts. Show that  $g(x) = (x+1)(x-12)$  is not one-to-one.
11. The function  $f(x) = \frac{4x+1}{x-10}$  is one-to-one.
- (a) 10 pts. Find the inverse  $f^{-1}$  of  $f$ .
  - (b) 5 pts. Find the range of  $f$ .
  - (c) 5 pts. Find the range of  $f^{-1}$ .