Math 194: Exam 1 **Name:** _____
Summer – 2015
07/16/2015
80 Minutes

Write your name on the appropriate line on the exam cover sheet. This exam contains 9 pages (including this cover page) and 7 questions. Check that you have every page of the exam. Answer the questions in the spaces provided on the question sheets. Be sure to answer every part of each question and show all your work. If you run out of room for an answer, continue on the back of the page — being sure to indicate the problem number.

Question	Points	Score
1	7	
2	11	
3	8	
4	6	
5	11	
6	7	
7	10	
Total:	60	

1. Complete the following parts:

   (a) (1 point) Define domain:

   (b) (1 point) Define range:

   (c) (1 point) Define linear function:

   (d) (3 points) What is the domain of the function $f(x) = \dfrac{\sqrt{x+1}}{x(x-1)}$

   (e) (1 point) Is $g(x) = \sqrt{x}$ the inverse to the function $f(x) = x^2$?

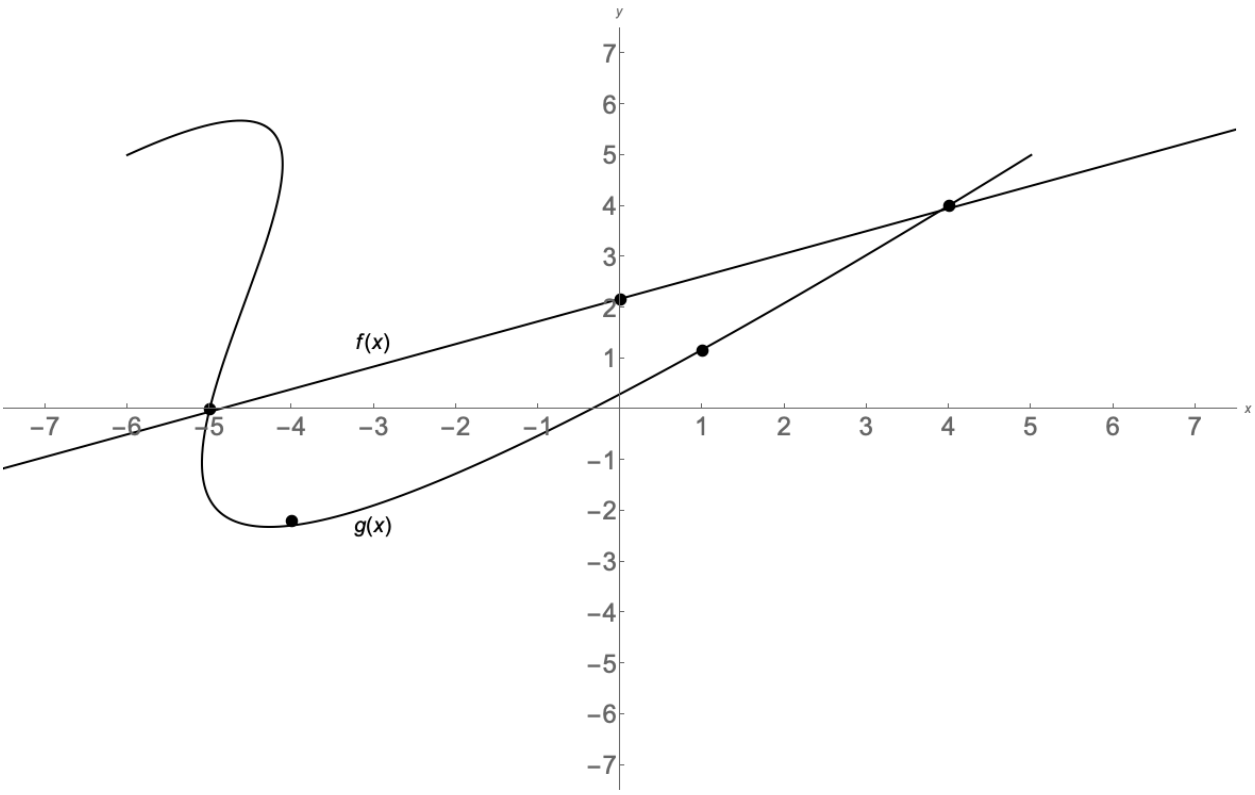
2. Let $f(x) = 5x + 14$ and $g(x) = 2x^2 - x - 6$

   (a) (1 point) What is $g(-1)$?

   (b) (1 point) What is $f(g(-1))$?

   (c) (4 points) Factor $g(x)$.

   (d) (5 points) Find the points of intersection between $f(x)$ and $g(x)$.



3. Use the graph above to answer the following questions:

(a) (1 point) Is $f(x)$ a function?

(b) (1 point) Is $g(x)$ a function?

(c) (1 point) What is $g(-4)$?

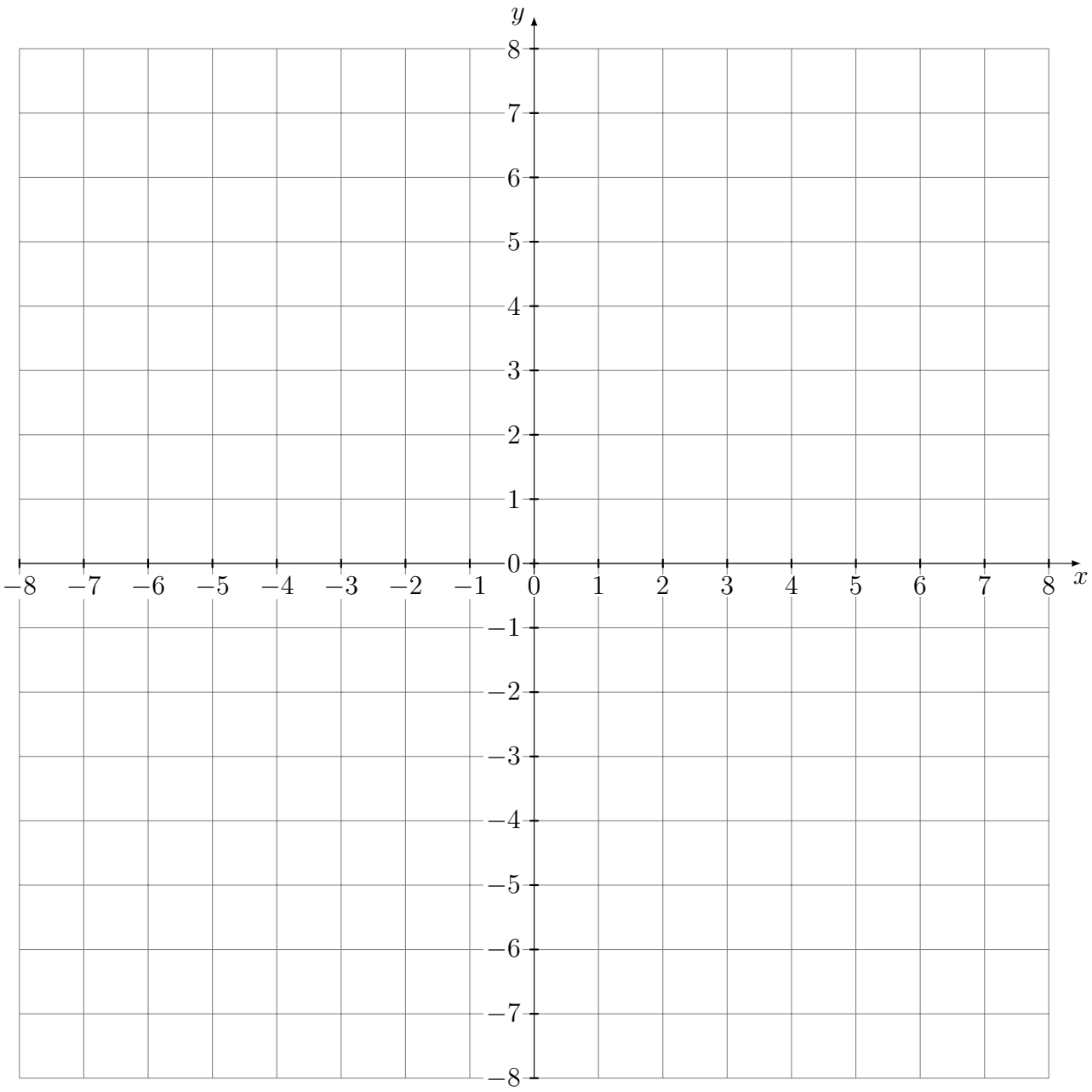
(d) (1 point) Give a value of x for which $g(x) = 1$.

(e) (2 points) What is the x-intercept for $f(x)$? What is the y-intercept for $f(x)$?

(f) (2 points) Solve $f(x) = g(x)$ for x.

4. (6 points) Use the coordinate plane below to graph the function

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



5. Let $f(x) = 3x^2 - 12x + 6$.

   (a) (4 points) Find the vertex and axis of symmetry for $f(x)$. Is the vertex a maximum or a minimum?

   (b) (5 points) Use the quadratic equation to solve the equation $f(x) = 0$.

   (c) (2 points) Use the previous part to give the factorization for $f(x)$.

6. Complete the following parts:

   (a) (2 points) Find the equation of a line with slope 3 and y-intercept -5.

   (b) (3 points) Find the equation of a line passing through the points $(-3, 2)$ and $(1, 8)$.

   (c) (2 points) Find an equation for a parabola with zeros $x = -4$ and $x = 5$.

7. Paul and Mary both open a checking account on the same day. The amount of money in euros in Paul's checking account t months after opening it is given by $P(t) = 2700 - 60t$ while the amount of money in euros in Mary's account t months after opening it is given by $M(t) = 3400 - 70t$.

   (a) (2 points) What is the y-intercept for $M(t)$? What does it represent in this context?

   (b) (2 points) What is the x-intercept for $P(t)$? What does it represent in this context?

   (c) (2 points) What is the slope for $M(t)$? What does it represent in this context?

   (d) (4 points) When do Paul and Mary have the same amount of money in their respective checking accounts? How much money do they have when they have the same amount?

Bonus Problems

The following are bonus questions. You should not attempt these questions until you are content with your responses on all other parts of the exam.

Bonus 1: Complete the following table:

Name	Polynomial Degree	Minimum Number of Points to [Uniquely] Determine
Constant		
Linear		
Quadratic		
Cubic		
Quartic		
Quintic		

Bonus 2: Determine the equation of *any* parabola that passes through the points $(-2, -1)$ and $(3, 1)$. Show how you arrived at this parabola.