Name:

Directions: This exam has nine questions, spread across nine pages (not counting this cover page). Answers must be justified appropriately on these pages; show all work and clearly mark your final answers. The format of your final answers should be consistent with the answers given to similar examples from class. You may use a calculator (but not a cell phone calculator), but notes and other study aids are prohibited.

Grading:

Problem	Points Possible	Points Earned
1	24	
2	24	
3	20	
4	20	
5	20	
6	24	
7	18	
8	30	
9	20	
Total	200	

1. Write the following expressions so that they have no negative exponents and no radical signs:

   (a) (8 pts) $\sqrt{t^5}$

   (b) (8 pts) $8z^{-4}$

   (c) (8 pts) $\frac{x^{-4}}{2\sqrt{y}}$

2. Simplify the following radical expressions ("simplify" means that your answer should be in the form $a\sqrt{b}$, where a and b are whole numbers and b is as small as possible):

   (a) (8 pts) $\sqrt{99}$

   (b) (8 pts) $\sqrt{800}$

   (c) (8 pts) $\sqrt{24} + \sqrt{6}$

3. (a) (10 pts) Solve the equation $x(x-8) = -15$. If there is no solution, say so.

(b) (10 pts) (This is unrelated to part (a).) Perform the following operation, and simplify your answer:

$$\frac{5}{x-1} + \frac{2}{x+3}$$

4. Let $f(x) = 2x^2 + x$ and let $g(x) = 2x - 3$. Compute the following:

   (a) (4 pts) $g(-1)$

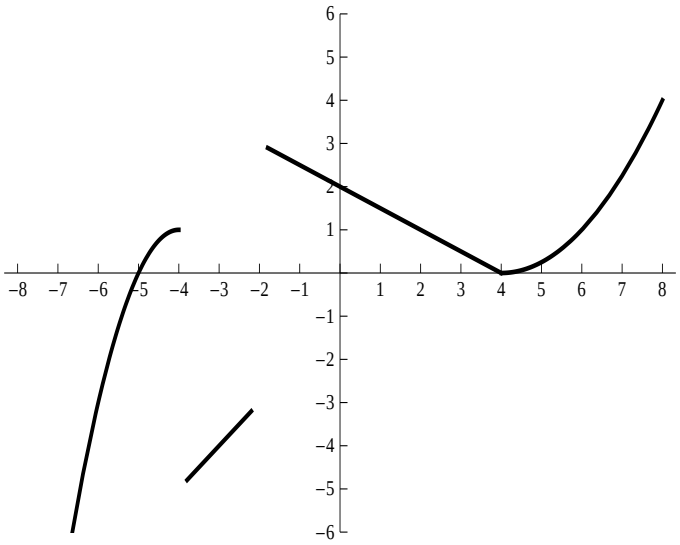
   (b) (4 pts) $(fg)(1)$

   (c) (4 pts) $(f \circ g)(4)$

   (d) (4 pts) $f(x-1)$ (please simplify your answer)

   (e) (4 pts) $(f+g)(2x)$ (please simplify your answer)

5. The graph of some unknown function f is given below.



Use the graph to estimate these quantities:

(a) (4 pts) $f(-2)$

(b) (4 pts) $f(-6+6)$

(c) (4 pts) $f(0)+f(2)$

(d) (4 pts) values of x such that $f(x)=1$

(e) (4 pts) $2f(0)$

6. (a) (12 pts) Write the equation of the line passing through the points $(-1, 4)$ and $(3, -2)$. (You can leave the answer in any form you like, so long as it is correct.)

(b) (12 pts) (This is unrelated to part (a).) Find the exact solution of the following system of equations (if there are infinitely many solutions or if there is no solution, say so):

$$\begin{cases} 7x - 3y = 30 \\ -2x + 5y = 44 \end{cases}$$

7. For each given angle, give the quadrant the angle lies in, and find the corresponding reference angle.

   (a) (6 pts) 223°

   (b) (6 pts) 321°

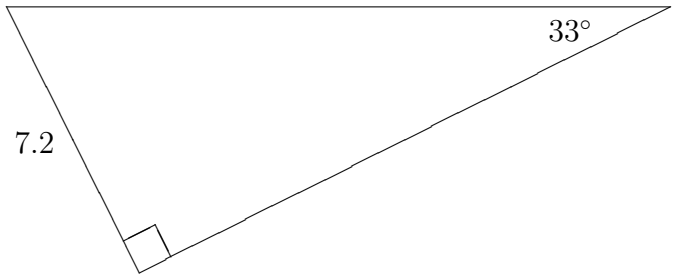
   (c) (6 pts) 5°

8. (a) (10 pts) Suppose $\tan\theta = 1.68$ and $\cos\theta > 0$. Find $\sin\theta$.

(b) (10 pts) Suppose $\cos\theta = \frac{9}{14}$ and $\cot\theta < 0$. Find $\csc\theta$.

(c) (10 pts) Suppose $\sin\theta = \frac{7}{11}$ and θ is in the second quadrant. Find θ (round your answer to the nearest tenth of a degree).

9. (a) (10 pts) Solve the following triangle (round all length measurements to two decimal places):



(b) (10 pts) Solve the following triangle (round all degree measurements to the nearest tenth of a degree):