Name:

Test 1 (**version A**): Appendices A, B, C, sections 1.3-1.5.

Complete the following problems to the best of your ability. **SHOW ALL OF YOUR WORK.** Unshown work will not be graded. You may use a calculator.

1. [9 pts] Sketch each of the following intervals on a number line.

   (a) $[-1, 3)$

   (b) $[3, \infty)$

   (c) $(-1, \infty) \cap (-6, 3]$

2. [27 pts] Simplify the following expressions entirely.

   (a) $(x^3 y^{-2})^3$

   (b) $\dfrac{2x^{-2}y^1}{4x^4\sqrt{y}}$

(c) $\dfrac{x^2-5x-6}{x^2-4x-12} \cdot \dfrac{x^2-4}{2-x}$

(d) $\dfrac{x^3-x^2}{3x^2+12x} \div \dfrac{x-1}{2x+8}$

(e) $\dfrac{y}{y-3} - \dfrac{2}{y-1}$

3. [12 pts] Completely factor the following expressions.

(a) $9x^3+3x^2$

(b) $x^2-7x+12$

(c) $2x^3-5x^2+6x-15$

4. [12 pts] Solve all of the following equations for x.

   (a) $\frac{1}{3} - \frac{1}{6}(x+2) = \frac{1}{9}$

   (b) $2x^2 - 7 = 11$

   (c) $x^2 - x = 6$

5. [18 pts] Solve all of these following inequalities for x. **Express your answer in interval form.**

   (a) $2x + 6 \geq 1$

   (b) $-2 < 3x + 4 \leq 3$

   (c) $x^2 + 2x < 3$

6. [6 pts] What is the domain of the function $f(x) = \frac{1}{\sqrt{x-3}}$?

7. [12 pts] A dockside stall sells chocolate-dipped frozen bananas. Mr. Manager, the manager, must pay a flat \$50 for upkeep on the stall. Every banana he sells also costs him \$1.60.

   (a) Write a function for C, the cost to Mr. Manager, in terms of x, the number of bananas he sells in a day.

   (b) What is the net change in cost from 5 bananas to 25 bananas?

   (c) Calculate and interpret $C(30)$.

8. [10 pts] For the following relations, determine the independent and dependent variable and determine whether or not the relation is a function. Explain your reasoning.

   (a) City as a function of population

   (b) Grade as a function of time spent studying