1.5 In-class Practice

1. Solve.

a) $-\frac{1}{2} \le \frac{4-3x}{5} \le \frac{1}{4}$

b) $|x+1| \ge 3$

c) $|5x-2| < 6$

d) $\left|\frac{x+1}{2}\right| \ge 4$

e) $3 - |3x+4| \le 1$

f) $7|x+2| + 5 > 4$

2. Solve.

a) $x^2 > 3(x+6)$

b) $x^2 < 4$

c) $(x+2)(x-1)(x-3) \le 0$

d) $(x-2)^2(x-3)(x+1) < 0$

e) $x^3 - 4x \ge 0$

f) $\frac{x^2+1}{(x+1)^2} > 0$

g) $\frac{4x}{2x+3} > 2$

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

3. **Do Powers Preserve Order?** If $a < b$, is $a^2 < b^2$? (Check both positive and negative values for a and b.) If $a < b$, is $a^3 < b^3$? On the basis of your observations, state a general rule about the relationship between a^n and b^n when $a < b$ and n is a positive integer.

4. **What's Wrong Here?** It is tempting to try to solve an inequality as if it were an equation. For instance, we might try to solve $1 < 3/x$ by multiplying both sides by x, to get $x < 3$, so the solution would be $(-\infty, 3)$. But that's wrong; for example, $x = -1$ lies in this interval but does not satisfy the original inequality. Explain why this method doesn't work (think about the *sign* of x). Then solve the inequality correctly.

5. Find the domain of

a) $f(x) = \sqrt{16 - 9x^2}$

b) $g(x) = \sqrt{3x^2 - 5x + 2}$

6. If a manufacturer sells x units of a certain product, revenue R and cost C (in dollars) are given by $R = 20x$ and $C = 2000 + 8x + 0.0025x^2$.
Use the fact that $profit = revenue - cost$ to determine how many units the manufacturer should sell to enjoy a profit of at least \$2400.

7. **Fencing a Garden** A determined gardener has 120 ft of deer-resistant fence. She wants to enclose a rectangular vegetable garden in her backyard, and she wants the area that is enclosed to be at least 800 ft^2. What range of values is possible for the length of her garden?