

Inequalities

Problem Set 12

1. Solve the following linear inequalities.

(a) $2x + 1 > 7$

(c) $5 - 4x < 12$.

(b) $11 - 3x \leq 5$

(d) $9 + 2x \geq 0$.

2. Solve the inequality $9 - 4x \leq 6$ by graphing the appropriate line and reading from your graph.

3. Solve the following inequalities and express the solution using interval notation.

(a) $x + 4 > 3x + 16$

(c) $5y - 6 \geq 2(1 - y)$.

(b) $3x + 11 \leq 6x + 8$

(d) $3(y - 5) - 4(y + 6) < 7$.

4. Solve the following quadratic inequalities.

(a) $x^2 - 3x - 4 > 0$

(d) $x^2 + 2x + 5 > 8$.

(g) $x^2 + 3x + 1 \geq 0$

(b) $x^2 - 3x - 4 \geq 0$

(e) $9 - x^2 \geq 0$

(h) $x^2 + 6x + 9 > 0$

(c) $x^2 - 3x - 4 < 0$.

(f) $4x^2 + 3x < 2x^2 + 2$

(i) $x^2 + 3x + 3 > 0$

5. Solve the following inequalities.

(a) $x^3 - 9x > 0$

(b) $(x + 3)(x + 1)(x - 1)^2 \leq 0$

(c) $(2 - x)^3(4 + x)^2 \leq 0$

6. For each of the following inequalities, use the Case Method to determine all real values of x for which the inequality holds.

(a) $\frac{1}{x - 2} < 3$

(b) $\frac{12}{3x + 2} > 4$

7. For each of the following inequalities, determine all real values of x for which the inequality holds.

(a) $\frac{x + 3}{x - 4} \leq 2$

(b) $\frac{x^2 + 8x + 12}{x + 1} > 0$

8. Solve the following absolute value equations.

(a) $|x| = 3$

(b) $|x - 2| = 5$

(c) $3|x + 5| + 6 = 15$

9. Solve the following absolute value inequalities.

(a) $|3x| < 24$

(b) $|x - 5| < 3$

(c) $\left| \frac{3x - 1}{2} \right| \leq 10$

(d) $\left| \frac{x - 2}{3} \right| > 2$

(e) $8 - |2x - 1| \leq 6$

(f) $2 < |x + 4| < 10$