

Algebra - Equations and Inequalities

Name: _____

Date: _____

Concepts

- Algebra - Equations and Inequalities
- Representing Inequalities on a Cartesian Plane
- Representing a Solution Set
- Solving Algebraic Inequalities
- Solving Equations and Inequalities
- Solving a Greatest Integer Equation
- Solving a Second Degree Equation or Inequality
- Solving a Square Root Equation or Inequality
- Solving an Exponential Equation or Inequality

Algebra — Equations and Inequalities

1. For each relation below, state whether it is an *equation* or an *inequality*, and name its type (first degree, second degree, square root, exponential, or greatest integer).

a) $2^{x-1} = 32$

b) $\left\lfloor \frac{x}{3} \right\rfloor = 4$

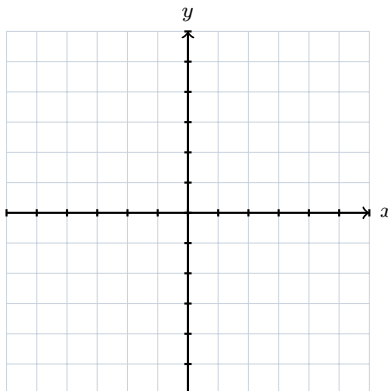
c) $\sqrt{2x+5} \leq 7$

d) $3(x-2)^2 - 12 = 0$

e) $5 - 4x > x + 1$

Representing Inequalities on a Cartesian Plane

2. On the grid, represent the solution set of $y \leq -\frac{2}{3}x + 4$. State whether the boundary line is solid or dashed, and verify by testing the origin whether the shaded half-plane is the one containing $(0, 0)$.



Representing a Solution Set

3. Write each solution set using interval notation.

- a) All real numbers greater than -5 and at most 2 .
- b) $\{x \in \mathbb{R} \mid x < -1 \text{ or } x \geq 4\}$
- c) All real numbers except 3 .

Solving Algebraic Inequalities

4. Solve $5 - 2(x + 3) > 4x - 7$ and express the solution set in interval notation.

Solving Equations and Inequalities

5. Solve $\frac{2x-1}{3} - \frac{x+4}{2} = 1$.

Solving a Greatest Integer Equation

6. Solve $\lfloor 2x - 1 \rfloor = 5$ and give the solution set in interval notation.

Solving a Second Degree Equation or Inequality

7. Solve $2x^2 - 7x - 15 = 0$ by factoring.

Solving a Square Root Equation or Inequality

8. Solve $2\sqrt{x-1} + 3 = 11$.

Solving an Exponential Equation or Inequality

9. Solve $5 \cdot 2^{x+1} = 160$.

Synthesis — drawing on several sheets in this topic

10. A market gardener builds a rectangular greenhouse whose length is 4 m more than its width. The municipal permit requires a floor area of at most 96 m^2 , and the supplier only delivers frames whose perimeter is at least 28 m. Determine all possible widths and give the answer as an interval, in metres.

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Algebra - Equations and Inequalities — with the reasoning written out in full — are available at tutorinmontreal.ca.