

Solving, Graphing and Modeling with Inequalities

Grade 9 – Algebra 1 math · Worksheet · Standards: A-REI.B.3, A-CED.A.1, A-CED.A.3

Name: _____ Date: _____ Class: _____

These problems train solving multi-step inequalities, reversing the sign correctly, graphing on a number line and writing interval notation, as required by A-REI.B.3. Early problems use one operation at a time, and later ones combine distribution and variables on both sides. The last six problems model real constraints (A-CED.A.1 and A-CED.A.3): budgets, averages, profits and temperature ranges. Decide whether the answer must be a whole number.

Standards: A-REI.B.3, A-CED.A.1, A-CED.A.3 · **Level:** Grade 9 Algebra 1

Problem 1 Add and compare (easy)

Solve $x + 7 > 12$ and describe the graph.

Problem 2 Divide by a positive (easy)

Solve $3x \leq 21$.

Problem 3 Two steps with a fraction (easy)

Solve $\frac{x}{4} - 2 \geq 1$.

Problem 4 Reverse the sign (easy)

Solve $-2x < 14$.

Problem 5 Write from a graph (easy)

Write the inequality shown by the graph.



Closed circle at -2 , shaded left.

Problem 6 Variables on both sides (medium)

Solve $6x - 5 > 2x + 11$ and graph the solution.

Problem 7 Negative coefficient (medium)

Solve $7 - 3x \geq 22$.

Problem 8 Distribute first (medium)

Solve $4(x - 2) < 2x + 10$.

Problem 9 Fraction inequality (medium)

Solve $\frac{(2x - 1)}{3} \leq 5$.

Problem 10 Compound inequality (and) (medium)

Solve $-7 < 2x - 1 \leq 9$, graph it and write it in interval notation.

Problem 11 Compound inequality (or) (medium)

Solve $3x + 2 < -7$ or $2x - 5 \geq 9$ and graph the solution.

Problem 12 Read a segment (medium)

Write the compound inequality and the interval notation for the graph.



A shaded segment from -1 to 4 .

Problem 13 Interval notation (medium)

Write each in interval notation: (a) $x > -1$ (b) $x \leq 9$ (c) $1 < x \leq 8$.

Problem 14 Test values (medium)

Is $x = -3$ a solution of $6 - 2x > 11$? Is $x = -2$? Then describe all solutions.



The solutions of $6 - 2x > 11$.

Problem 15 Camp activities (hard)

A camp trip costs \$18 for the bus plus \$7.50 for each activity. Jordan can spend at most \$60. Write and solve an inequality, then state the greatest number of activities.

Problem 16 Test average (hard)

Dana scored 78, 85 and 91 on three tests. What must she score on the fourth test to have an

average of at least 85?

Problem 17 Food truck profit (hard)

A food truck sells wraps for \$6.50 each. Each wrap costs \$1.90 to make, and the truck has \$420 in daily fixed costs. How many wraps must it sell to earn a profit greater than \$300?

Problem 18 Greenhouse range (hard)

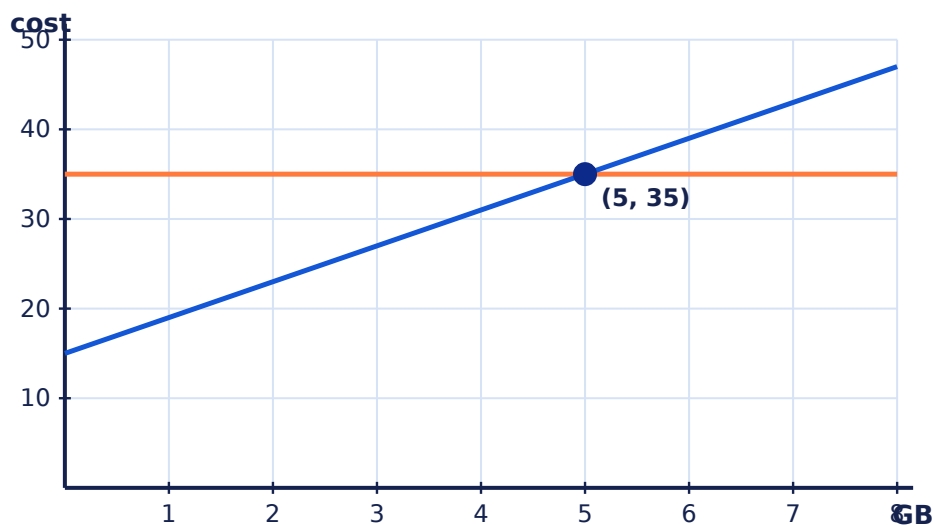
A greenhouse must stay between 59°F and 86°F, inclusive. With $F = 1.8C + 32$, find the allowed temperatures in degrees Celsius.

Problem 19 Robotics budget (hard)

A club has \$300. A kit costs \$24 and a sensor costs \$9. It buys 6 kits. Write and solve an inequality for the number of sensors s it can still buy.

Problem 20 Phone plan comparison (hard)

Plan A costs a flat \$35 per month. Plan B costs \$15 plus \$4 per gigabyte. For how many gigabytes g is Plan B cheaper? Use the graph.



Plan A (orange, flat \$35) and Plan B (blue, \$15 + \$4 per GB).