

Linear Inequalities: math practice, Grade 9 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Words to symbols



Write an inequality for each statement, using x for the number.

- a. x is at least 18.
- b. x is fewer than 12.
- c. x is no more than 40.
- d. x is more than 7.
- e. x is at most 9.
- f. x is a minimum of 5.

2 Testing solutions



Which of the numbers 5, 4, 6, and -2 are solutions of $3x - 4 < 11$?

3 One-step inequalities



Solve each inequality.

a. $x + 7 \leq 12$

b. $x - 4 > -1$

c. $6x < 54$

d. $\frac{x}{5} \geq 3$

4 Flip the sign



Solve each inequality.

a. $-3x < 18$

b. $-x \geq 5$

c. $\frac{x}{-4} > 2$

d. $-7x \leq -21$

5 Reading a graph



Write the inequality shown by each number line.



The first graph is on top, the second below it.

6 Drawing graphs



Draw a number line and graph each solution set: (a) $x > 1$, (b) $x \leq -3$.

7 Two-step inequalities



Solve each inequality.

a. $2x + 3 > 11$

b. $5x - 8 \leq 17$

c. $\frac{x}{3} + 2 < 6$

d. $4x + 1 \geq -11$

8 Variables on both sides



Solve each inequality.

a. $5x - 7 > 2x + 8$

b. $3(x + 4) \leq 2x + 9$

c. $7 - 2x \geq 4x + 25$

9 All numbers or none



Solve each inequality and describe the solution set.

a. $2(x + 3) > 2x + 1$

b. $3x - 5 \leq 3x - 8$

c. $x + 5 \geq x + 5$

10 Spot the error



A student solves $-2x + 1 > 9$ like this: "Subtract 1: $-2x > 8$. Divide by -2 : $x > -4$."

Find the mistake, give the correct answer, and graph it.

11 Compound with and



Solve and write each answer as a chain.

a. $-7 < 3x - 1 \leq 11$

b. $4 \leq -2x < 10$

12 Compound with or



Solve each compound inequality and graph part (a).

a. $x + 3 < 1$ or $x - 2 \geq 5$

b. $2x > 6$ or $-x \geq 1$

13 Absolute value equations



Solve each equation.

a. $|x| = 8$

b. $|x + 3| = 5$

c. $|3x - 6| = 12$

d. $|2x + 1| = -4$

14 Absolute value inequalities



Solve each inequality.

a. $|x| < 6$

b. $|x| \geq 4$

c. $|x - 2| \leq 3$

d. $|x + 1| > 2$

15 School supplies budget

Mia has \$60 to spend. She has already spent \$22.50, and each notebook costs \$3.75. Write and solve an inequality to find how many more notebooks she can buy.

16 Fractions and decimals

Solve each inequality.

a. $\frac{2x - 1}{3} - \frac{x + 2}{4} \geq 1$

b. $0.4x + 1.2 < 0.1x - 0.9$

17 Harder absolute equations

Solve each equation.

a. $3|2x - 1| + 4 = 19$

b. $|3x - 2| = |x + 6|$

c. $|5 - 2x| = 7$

18 Harder absolute inequalities

Solve each inequality.

a. $2|x - 4| + 3 < 11$

b. $-3|x + 1| \leq -12$

c. $|4x - 3| - 5 > 0$

19 Bottle tolerance



A machine fills bottles with 500 milliliters (mL) of juice. Each bottle must be within 6 mL of the target. (a) Write an absolute value inequality for the volume v . (b) Solve it. (c) Is a bottle of 507 mL acceptable? (d) Convert the limits to U.S. fluid ounces ($1 \text{ mL} \approx 0.0338 \text{ fl oz}$).

20 Reaching a test average



Jordan's first four test scores are 82, 90, 78, and 88. The maximum score is 100. What must the fifth score s be for the average of all five tests to be at least 85?

21 Bakery profit



A bakery sells muffins for \$2.75 each. The ingredients cost \$1.10 per muffin, and the weekly fixed costs are \$120. How many muffins must be sold in a week to earn a profit of at least \$300?

22 Comparing two plans



Plan A costs a flat \$12 a month for movies. Plan B costs \$4 a month plus \$1.60 per movie. (a) For how many movies is Plan B cheaper? (b) For how many movies is it the same price? Graph the answer to (a).



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