

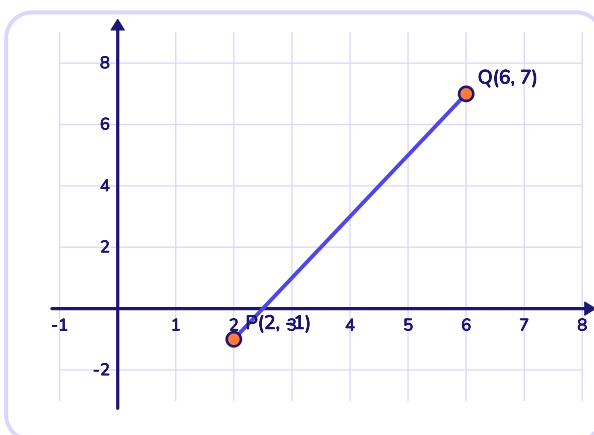
Linear Equations, Inequalities and Systems: math practice, Grade 11 – download the PDF

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

1 Slope from two points



The points $P(2, -1)$ and $Q(6, 7)$ are shown below.



Find the slope of line PQ and write its equation in slope-intercept form.

2 Rewrite in slope-intercept form



Rewrite $3x + 4y = 12$ in slope-intercept form. Then give the slope, the y-intercept and the x-intercept.

3 Solve a linear equation



Solve $5(x - 2) + 3 = 2x + 14$.

4 A basic absolute value equation



Solve $|x + 4| = 9$.

5 A three-part inequality



Solve $-5 \leq x - 3 < 4$, write the answer in interval notation, and describe how to graph it on a number line.

6 Is it a solution?



Decide whether each ordered pair is a solution of the system $x + y = 1$ and $2x - y = 8$:
(a) $(3, -2)$; (b) $(1, 0)$.

7 Substitution warm-up



Solve by substitution: $y = 3x - 4$ and $2x + y = 11$.

8 A parallel line



Find the equation of the line that passes through $(3, -2)$ and is parallel to $y = -\frac{1}{2}x + 5$.

9 An absolute value inequality



Solve $|4 - 3x| \leq 10$ and write the solution in interval notation.

10 An or compound inequality



Solve $2x + 3 < -5$ or $4 - x \leq 1$. Write the solution in interval notation.

11 Elimination practice



Solve by elimination: $4x - 3y = -1$ and $6x + 5y = 27$.

12 Movie theater tickets



A theater sold 150 tickets for one evening. Adult tickets cost 12 dollars and child tickets cost 8 dollars. The total revenue was 1,448 dollars. How many tickets of each kind were sold?

13 No solution or infinitely many?



Classify each system as having one solution, no solution, or infinitely many solutions. Justify your answer.

(a) $6x - 9y = 12$ and $2x - 3y = 4$

(b) $y = 2x + 1$ and $y = 2x - 5$

14 Inverse of a 2 by 2 matrix



Let $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$.

(a) Find $\det A$ and A^{-1} .

(b) Use A^{-1} to solve $2x + 5y = 9$ and $x + 3y = 5$.

15 A system with three unknowns



Solve $2x + y - z = 0$, $x - y + 2z = 9$, $3x + 2y + z = 7$.

16 The coin jar



A jar holds 30 coins, all nickels, dimes and quarters, worth 3.30 dollars in all. There are twice as many dimes as quarters. How many coins of each type are in the jar?

17 Planting plan



A farmer plants x acres of corn and y acres of soybeans. The constraints are $x + y \leq 40$ (land), $2x + 3y \leq 90$ (work hours in hundreds), $x \geq 0$ and $y \geq 0$. The profit is $P = 120x + 150y$ dollars. Find the vertices of the feasible region and the maximum profit.

18 Minimizing a cost



A feed mix uses x kg of grain A and y kg of grain B with $x + 2y \geq 10$, $3x + y \geq 15$, $x \geq 0$, $y \geq 0$. The cost is $C = 4x + 3y$. The feasible region is unbounded, but its corner points still contain the minimum. Find the minimum cost.

19 Tolerance with absolute value



(a) A machine fills bottles with 500 mL of juice, and a bottle is accepted when the volume v is within 6 mL of 500. Write an absolute value inequality and solve it. Are volumes of 493.5, 505.9 and 506.2 mL accepted?

(b) A greenhouse must stay between 68 and 76 degrees Fahrenheit. Write an absolute value inequality for the temperature T .

20 Boat and current



A boat travels 36 miles upstream in 3 hours and returns the same 36 miles downstream in 2 hours. Find the speed of the boat in still water and the speed of the current.

21 Parameter in a system



Consider the system $2x + ky = 8$ and $3x + 6y = 12$.

- (a) For which value of k is the determinant of the coefficient matrix equal to zero?
- (b) For that value of k , does the system have no solution or infinitely many?



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