LESSON MAKER PRO

Same Line, New Form

Convert linear equations without changing their solutions.

HIGH SCHOOL · MT.CORE.ALG.LIN.4.b

MT.CORE.ALG.LIN.4.b "Understand that linear equations can be represented in multiple forms and the specific features of each form by: Converting between slope-intercept, point-slope, and standard form symbolically,"

NAME _____ DATE _____

THREE FORMS, ONE LINE

Slope-intercept form, $y = mx + b$, shows the slope and y-intercept. Point-slope form, $y - y_1 = m(x - x_1)$, uses a slope and a point. To write standard form, $Ax + By = C$, distribute and move terms so A, B, and C are integers.

WORKED EXAMPLE

Convert $y - 8 = 7(x + 9)$ to standard form.

1. Distribute: $y - 8 = 7x + 63$.
2. Add 8: $y = 7x + 71$.
3. Move the x-term: $7x - y = -71$.

Answer: $7x - y = -71$

PRACTICE 6 problems

1 Convert $y = 3x - 4$ to standard form.

ANSWER _____

2 Convert $y - 1 = -4(x - 3)$ to slope-intercept form.

ANSWER _____

3 Convert $2x + 3y = 12$ to slope-intercept form.

ANSWER _____

4 Convert $y = (1/2)x + 1$ to point-slope form using the point (2, 2).

ANSWER _____

5 Convert $y + 3 = -2(x - 1)$ to standard form.

ANSWER _____

6 Convert $3x - 4y = 12$ to point-slope form using the point (4, 0).

ANSWER _____

APPLY IT Show your work

1 A concert ticket site charges a $12 service fee plus $3 per ticket. Let x be the number of tickets and y be the total cost in dollars. Write an equation in slope-intercept form, then convert it to standard form.

WORK SPACE

ANSWER _____

2 After 2 weeks, you have $18 in a concert fund. You add $6 each week. Let x be the number of weeks since you started and y be the dollars in the fund. Write an equation in point-slope form using (2, 18), then convert it to standard form.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Convert y + 2 = (-3/4)(x - 4) to standard form with integer coefficients. Explain why multiplying both sides of an equation by 4 does not change its solutions.

WORK SPACE AND ANSWER

ANSWER KEY # Same Line, New Form

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Convert y = 3x - 4 to standard form.	**3x - y = 4**
2	Convert y - 1 = -4(x - 3) to slope-intercept form.	**y = -4x + 13**
3	Convert 2x + 3y = 12 to slope-intercept form.	**y = (-2/3)x + 4**
4	Convert y = (1/2)x + 1 to point-slope form using the point (2, 2).	**y - 2 = (1/2)(x - 2)**
5	Convert y + 3 = -2(x - 1) to standard form.	**2x + y = -1**
6	Convert 3x - 4y = 12 to point-slope form using the point (4, 0).	**y - 0 = (3/4)(x - 4)**

PART 2 · APPLY IT

1. **y = 3x + 12; 3x - y = -12** The cost increases by $3 per ticket and starts at $12. Move y and the constant to write the equation in standard form.
2. **y - 18 = 6(x - 2); 6x - y = -6** Use the weekly increase of $6 as the slope. Distribute to get y = 6x + 6, then rearrange.

CHALLENGE

3x + 4y = 4. Multiplying both sides by the same nonzero number keeps the two sides equal for exactly the same x- and y-values.

Accept equivalent point-slope equations that use the required point. For standard form, expect integer coefficients with a positive x-coefficient and no common factor.