LESSON MAKER PRO

One Line, Three Forms

Rewrite linear equations without changing the line.

HIGH SCHOOL · A1.A.4.4

A1.A.4.4 "Express linear equations in slope-intercept, point-slope, and standard forms. Convert between these forms."

NAME _____ DATE _____

THREE WAYS TO WRITE A LINE

Slope-intercept form, $y=mx+b$, shows the slope m and y-intercept b. Point-slope form, $y-y_1=m(x-x_1)$, uses a slope and a point. To write standard form, $Ax+By=C$, clear fractions and move the x and y terms to the same side.

WORKED EXAMPLE

A line has slope $-5/6$ and passes through $(12, 9)$. Write its equation in all three forms.

1. Use the slope and point: $y-9=-5/6(x-12)$.
2. Distribute and solve for y: $y-9=-5/6x+10$, so $y=-5/6x+19$.
3. Clear the fraction and move the x term: $6y=-5x+114$, so $5x+6y=114$.

Answer: Point-slope: $y-9=-5/6(x-12)$. Slope-intercept: $y=-5/6x+19$. Standard: $5x+6y=114$.

PRACTICE 6 problems

1 Rewrite $y=2x-7$ in point-slope form using the point $(3, -1)$.

ANSWER _____

2 Rewrite $y+4=-2(x-1)$ in slope-intercept form.

ANSWER _____

3 Rewrite $3x+2y=8$ in slope-intercept form.

ANSWER _____

4 Rewrite $y=-1/4x+7$ in standard form with integer coefficients and a positive x coefficient.

ANSWER _____

5 Rewrite $y-1=3/2(x+4)$ in standard form with integer coefficients and a positive x coefficient.

ANSWER _____

6 Rewrite $2x-3y=7$ in point-slope form using the point $(-1, -3)$.

ANSWER _____

APPLY IT Show your work

1 A music subscription costs $11 for one month and $27 for three months. The total cost increases at a constant rate. Let x be the number of months and y be the total cost in dollars. Write the cost equation in point-slope form using (1, 11), then in slope-intercept form.

WORK SPACE

ANSWER _____

2 At a school festival, you pay $7 to enter and $2 for each game. Let x be the number of games and y be the total cost in dollars. Write the cost equation in slope-intercept form, then in standard form with a positive x coefficient.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A line passes through (-4, 7) and (2, -2). Write its equation in point-slope, slope-intercept, and standard form. Explain how you know all three equations describe the same line.

WORK SPACE AND ANSWER

One Line, Three Forms

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Rewrite y=2x-7 in point-slope form using the point (3, -1).	**y+1=2(x-3)**
2	Rewrite y+4=-2(x-1) in slope-intercept form.	**y=-2x-2**
3	Rewrite 3x+2y=8 in slope-intercept form.	**y=-3/2x+4**
4	Rewrite y=-1/4x+7 in standard form with integer coefficients and a positive x coefficient.	**x+4y=28**
5	Rewrite y-1=3/2(x+4) in standard form with integer coefficients and a positive x coefficient.	**3x-2y=-14**
6	Rewrite 2x-3y=7 in point-slope form using the point (-1, -3).	**y+3=2/3(x+1)**

PART 2 · APPLY IT

1. **Point-slope: y-11=8(x-1). Slope-intercept: y=8x+3.** The cost rises by $16 over two months, so the slope is 8. Use (1, 11) in point-slope form, then expand and solve for y.
2. **Slope-intercept: y=2x+7. Standard: 2x-y=-7.** The entry fee is the y-intercept, and the cost per game is the slope. Move y to the other side to write standard form.

CHALLENGE

Point-slope: y-7=-3/2(x+4). Slope-intercept: y=-3/2x+1. Standard: 3x+2y=2. The slope between the given points is -3/2. Expanding the point-slope equation gives the slope-intercept equation, and clearing its fraction gives the standard equation.

Accept equivalent point-slope equations that use a point on the line. For standard form, require integer coefficients and a positive x coefficient where specified.