LESSON MAKER PRO

Line Form Lab

Use three equation forms to reveal a line's properties.

GRADE 8 · 8.FGR.5.5

8.FGR.5.5 "Write and explain the equations y = mx + b (slope-intercept form), Ax + By = C (standard form), and $(y - y_1) = m(x - x_1)$ (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different..."

NAME _____ DATE _____

THREE VIEWS OF A LINE

A linear function has a straight-line graph. In y = mx + b, m is the slope and b is the y-intercept. In Ax + By = C, rewrite the equation to find slope and intercepts. In (y - y1) = m(x - x1), you can see a slope and one point on the line.

WORKED EXAMPLE

A line has slope -2 and passes through (3, 7). Write the line in point-slope form, slope-intercept form, and standard form.

1. Start with point-slope form: y - 7 = -2(x - 3).
2. Distribute: y - 7 = -2x + 6.
3. Add 7 to both sides: y = -2x + 13.
4. Move 2x to the left: 2x + y = 13.

Answer: Point-slope: y - 7 = -2(x - 3); slope-intercept: y = -2x + 13; standard: 2x + y = 13

PRACTICE 6 problems

1 For y = 5x - 6, identify the slope and the y-intercept.

ANSWER _____

2 Rewrite 8x + 5y = 40 in slope-intercept form.

ANSWER _____

3 Write a point-slope equation for a line with slope 1/4 that passes through (6, -5).

ANSWER _____

4 Rewrite y = 8/5x - 6 in standard form using integer coefficients.

ANSWER _____

5 A line passes through (-4, 8) and has slope 5/6. Write its equation in point-slope form.

ANSWER _____

6 The equation 9x - 4y = 36 represents a line. Rewrite it in point-slope form using the point (4, 0).

ANSWER _____

APPLY IT Show your work

1 A music app charges an $8 sign-up fee and $5 each month. Let x be the number of months and let y be the total cost in dollars. Write a slope-intercept equation. Then explain what the slope and y-intercept mean in this situation.

WORK SPACE

ANSWER _____

2 In a video game challenge, a player starts with 36 energy points and loses 4 energy points each round. Let x be rounds played and let y be energy points. Write the rule in slope-intercept form and standard form. Then write point-slope form using the point after 5 rounds.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Student A writes 15x + 5y = 60. Student B writes y - 6 = -3(x + 2). Do these equations represent the same line? Explain by rewriting each equation in slope-intercept form.

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ANSWER KEY

Line Form Lab

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For y = 5x - 6, identify the slope and the y-intercept.	**Slope: 5; y-intercept: -6**
2	Rewrite 8x + 5y = 40 in slope-intercept form.	**y = -8/5x + 8**
3	Write a point-slope equation for a line with slope 1/4 that passes through (6, -5).	**y + 5 = 1/4(x - 6)**
4	Rewrite y = 8/5x - 6 in standard form using integer coefficients.	**8x - 5y = 30**
5	A line passes through (-4, 8) and has slope 5/6. Write its equation in point-slope form.	**y - 8 = 5/6(x + 4)**
6	The equation 9x - 4y = 36 represents a line. Rewrite it in point-slope form using the point (4, 0).	**y - 0 = 9/4(x - 4)**

PART 2 · APPLY IT

1. **y = 5x + 8. The slope 5 means the cost increases by $5 each month. The y-intercept 8 means the starting sign-up fee is $8.** The monthly charge is the rate of change, so it is the slope. The sign-up fee is the cost when x = 0, so it is the y-intercept.
2. **Slope-intercept: y = -4x + 36; standard: 4x + y = 36; point-slope: y - 16 = -4(x - 5).** The energy decreases by 4 each round, so the slope is -4, and the starting energy is 36. After 5 rounds, y = -4(5) + 36 = 16.

CHALLENGE

No. Student A's equation is y = -3x + 12. Student B's equation is y = -3x, so the lines have the same slope but different y-intercepts.

Accept equivalent equations, including point-slope equations that use any point on the same line. In standard form, accept equivalent equations with integer coefficients, including forms created by multiplying every term by the same nonzero integer.