

Line Equation Lab

Write linear equations from tables, points, and situations.

GRADE 8 • MA.8.AR.3.3

MA.8.AR.3.3 "Given a table, graph or written description of a linear relationship, write an equation in slope-intercept form."

NAME _____

DATE _____

BUILD THE EQUATION

A linear equation in slope-intercept form is $y = mx + b$, where m is the slope and b is the y-intercept. Find the slope by dividing the change in y by the change in x , then use a point to find b .

WORKED EXAMPLE

Write an equation for the relationship in this table. x : 7, 14, 21. y : 9, 12, 15.

1. From $x = 7$ to $x = 14$, y changes from 9 to 12.
2. $m = (12 - 9)/(14 - 7) = 3/7$.
3. Use $(7, 9)$: $9 = 3/7(7) + b$, so $b = 6$.
4. Write $y = 3/7x + 6$.

Answer: $y = 3/7x + 6$

PRACTICE 6 problems

- 1** Write an equation for the relationship in this table. x : 0, 2, 4. y : -4, 0, 4.

ANSWER _____

- 2** Write an equation for the relationship in this table. x : -5, 0, 5. y : 23, 18, 13.

ANSWER _____

- 3** A graph contains the points $(0, 10)$ and $(5, 0)$. Write the equation of the line.

ANSWER _____

- 4** A line crosses the y -axis at -8 and rises 5 units for every 1 unit it moves right. Write its equation.

ANSWER _____

- 5** A line crosses the y -axis at 13. For every 5 units x increases, y decreases by 4 units. Write its equation.

ANSWER _____

- 6** Write an equation for the relationship in this table. x : 0, 4, 8. y : 13, 18, 23.

ANSWER _____

APPLY IT Show your work

- 1** At the start of a gaming challenge, you have 17 virtual coins. You earn 4 virtual coins for each quest you complete. Let x be the number of quests and y be your total number of virtual coins. Write an equation for y .

WORK SPACE

ANSWER _____

- 2** A club orders custom wristbands. The company charges a \$13 design fee and \$5 for each wristband. Let x be the number of wristbands and y be the total cost in dollars. Write an equation for y .

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A line passes through $(4, 0)$ and $(8, 10)$. Write its equation in slope-intercept form. Then explain how you found both the slope and the y -intercept.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Write an equation for the relationship in this table. x: 0, 2, 4. y: -4, 0, 4.	$y = 2x - 4$
2	Write an equation for the relationship in this table. x: -5, 0, 5. y: 23, 18, 13.	$y = -x + 18$
3	A graph contains the points (0, 10) and (5, 0). Write the equation of the line.	$y = -2x + 10$
4	A line crosses the y-axis at -8 and rises 5 units for every 1 unit it moves right. Write its equation.	$y = 5x - 8$
5	A line crosses the y-axis at 13. For every 5 units x increases, y decreases by 4 units. Write its equation.	$y = -4/5x + 13$
6	Write an equation for the relationship in this table. x: 0, 4, 8. y: 13, 18, 23.	$y = 5/4x + 13$

PART 2 • APPLY IT

1. $y = 4x + 17$ The starting amount is the y-intercept, 17. The number of coins increases by 4 for each quest, so the slope is 4.
2. $y = 5x + 13$ The fixed design fee is the y-intercept, 13. Each wristband adds \$5, so the slope is 5.

CHALLENGE

$y = 5/2x - 10$. The slope is $(10 - 0)/(8 - 4) = 5/2$. Using $(4, 0)$, $0 = 5/2(4) + b$, so $b = -10$.

Accept algebraically equivalent equations that are written in slope-intercept form. For the challenge, accept a correct explanation that finds the slope from the two points and uses either point to find the y-intercept.