

PART I GET STARTED**Today's Mathematics**

We will write equations using a slope and a point or two points.

Essential Question

How can you write an equation when you know a slope and one point?

DO NOW

1. Find the slope through $(-2, 5)$ and $(4, -1)$.

2. Use $y = mx + b$ and one point to find b .

3. Write the resulting equation.

SEE IT

For a line of slope 2 through $(3, 5)$, compare $y - 5$ with $2(x - 3)$.

QUICK WRITE | 2 MINUTES

Explain what $x - 3$ and $y - 5$ measure from the point $(3, 5)$.

PART II INVESTIGATE**BUILD THE IDEA**

1. From $m = \frac{y - y_1}{x - x_1}$, derive $y - y_1 = m(x - x_1)$. What restriction is needed when dividing?
2. Write point-slope form for slope 2 through $(3, 5)$.
3. Use $(-2, 5)$ and $(4, -1)$. Find the slope, then write a point-slope equation using each point.
4. Convert both equations in Problem 3 to slope-intercept form. What do you notice?

COMPARE AND EXPLAIN

Compare writing from one point and a slope with writing from two points. What extra step is needed?

APPLY

1. Write point-slope form through $(-3, 8)$ with $m = -4$.
2. Convert your equation to standard form.

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

Point-slope form is $y - y_1 = m(x - x_1)$. Calculate m first when two points are given. Different anchor points can give equivalent equations.

WORKED MODEL

Slope -2 through $(4, 3)$ gives $y - 3 = -2(x - 4)$. Distribute and isolate y : $y = -2x + 11$.

FOCUSED PRACTICE

1. Write the line with $m = 3$ through $(-2, 4)$.
2. Write the line through $(1, -3)$ and $(5, 9)$.
3. Through $(2, 1)$, write lines parallel and perpendicular to $y = \frac{1}{2}x - 6$.

MATH WRITE | 5 MINUTES

Explain why different point-slope equations can represent the same line.

PART IV PUZZLE PRACTICE

Homework

What Do You Call A Ghost Cheerleader?

Write the letter of each answer in the box containing the exercise number.

Write in point-slope form an equation of the line that passes through the given point and has the given slope.

1. $(1, 5); m = 2$
2. $(-2, 4); m = -3$
3. $(4, 2); m = 3$
4. $(-1, 5); m = -2$
5. $(2, -4); m = -3$
6. $(-5, 1); m = 2$

Write in slope-intercept form an equation of the line that passes through the given points.

7. $(-5, -5), (5, -7)$
8. $(-3, -4), (3, 0)$
9. $(-2, -7), (2, -1)$
10. $(-6, -4), (6, 4)$

11. You go to an arcade and purchase a card with game credits. After playing 5 games, you have 33 credits left. You play 4 more games and have 21 credits left. Write an equation that represents the number of credits y on the card after x games.
12. You go to a school dance. There is an entrance fee and slices of pizza for sale. After having 1 slice of pizza, you have spent \$6. After having 2 more slices of pizza, you have spent \$10. Write an equation that represents the total cost y after buying x slices of pizza.
13. You make 2 headbands and have 6 feet of ribbon left. You make 1 more headband and have 4 feet of ribbon left. Write an equation that represents the amount of ribbon y you have left after making x headbands.

Answers

- R. $y - 4 = -3(x + 2)$
- M. $y = \frac{2}{3}x$
- E. $y = 2x + 4$
- I. $y + 4 = -3(x - 2)$
- P. $y = -2x + 10$
- I. $y = -3x + 48$
- A. $y - 2 = 3(x - 4)$
- T. $y = \frac{2}{3}x - 2$
- E. $y - 5 = 2(x - 1)$
- T. $y - 1 = 2(x + 5)$
- S. $y = \frac{3}{2}x - 4$
- T. $y - 5 = -2(x + 1)$
- H. $y = -\frac{1}{5}x - 6$

4	7	1		6	12	3	10		9	13	5	2	11	8
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