Writing Equations of Lines

$Y = mx + b$

- Given the slope and one point.
- Given two points.

To write an equation given the slope and one point	Use $y = mx + b$ for the equation. Replace m with the given slope and the coordinates of the given point for x and y. Solve the equation for the y-intercept, b. Rewrite the equation with the slope for m and the y-intercept for b.

. The slope is 3 and the line passes through the point (5, 16).

$y = mx + b$	*Use slope-intercept form.*
$y = 3x + b$	*Replace m with the slope.*
$16 = 3 \cdot 5 + b$	*Replace x and y.*
$1 = b$	*Solve for b.*
$y = 3x + 1$	*Rewrite the equation.*

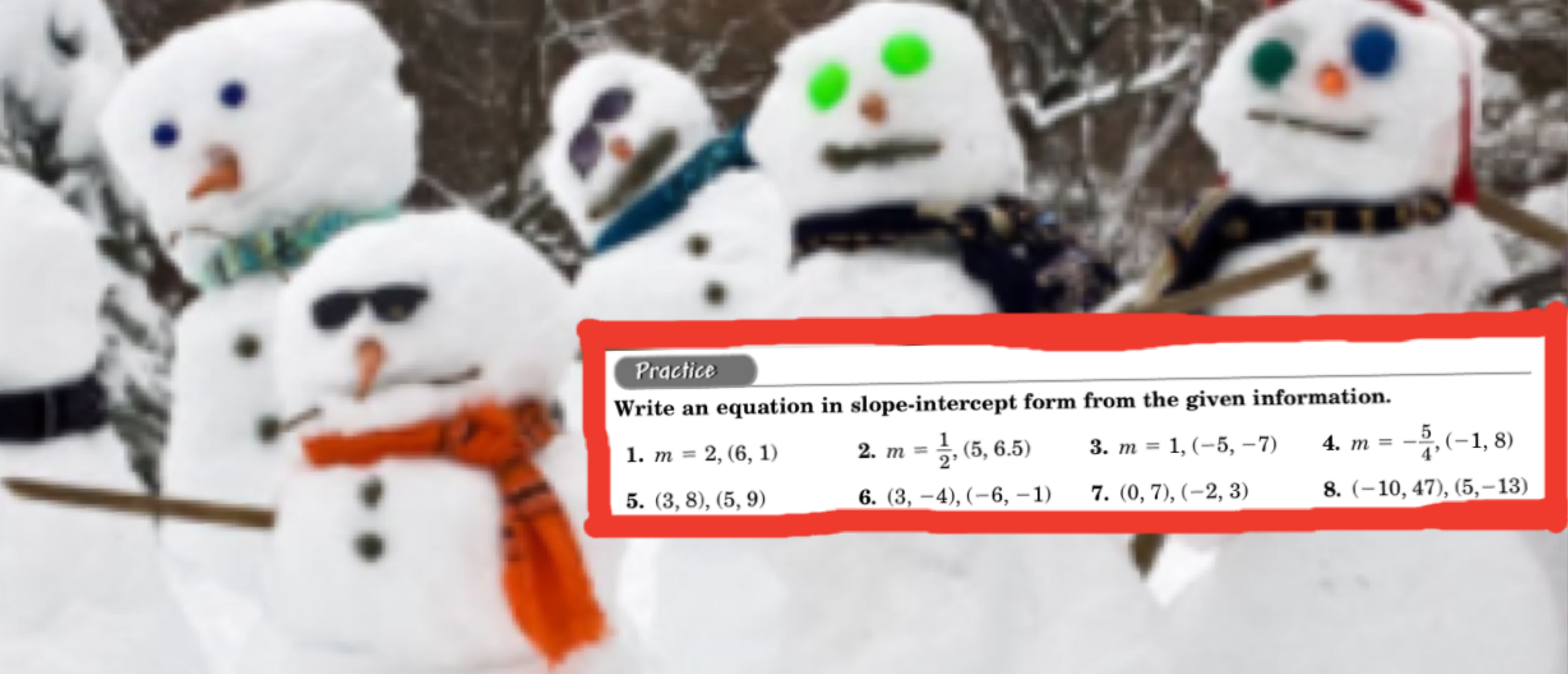
You try! The slope is 5 and the line passes through (2,3).

To write an equation given two points	Use the slope formula to calculate m. Choose any of the two given points to use in place of x and y in $y = mx + b$. Replace m with the slope you just calculated. Solve for b. Rewrite the equation with the slope for m and the y-intercept for b.

The line passes through the points (10, −4) and (−7, 13).

$m = \frac{y_2 - y_1}{x_2 - x_1}$	*Use the slope formula.*
$m = \frac{13 - (-4)}{-7 - 10}$	*Substitute.*
$m = -1$	*Solve for m.*
$y = mx + b$	
$-4 = (-1)10 + b$	*Substitute m, x, and y.*
$6 = b$	*Solve for b.*
$y = -x + 6$	*Rewrite the equation.*

You try! The line passes through (3,5) and (1,9).



Practice

Write an equation in slope-intercept form from the given information.

1. $m = 2, (6, 1)$

2. $m = \frac{1}{2}, (5, 6.5)$

3. $m = 1, (-5, -7)$

4. $m = -\frac{5}{4}, (-1, 8)$

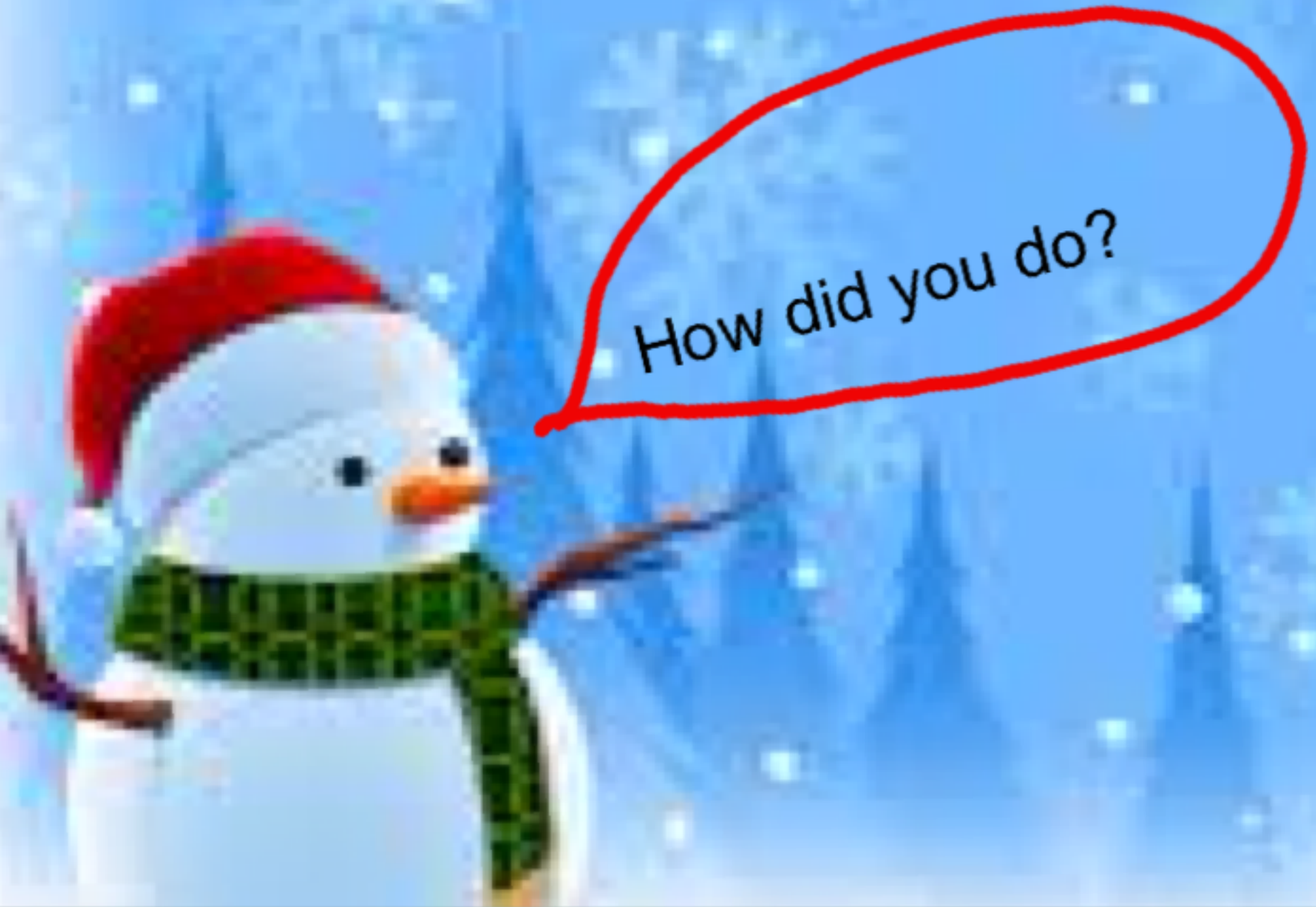
5. $(3, 8), (5, 9)$

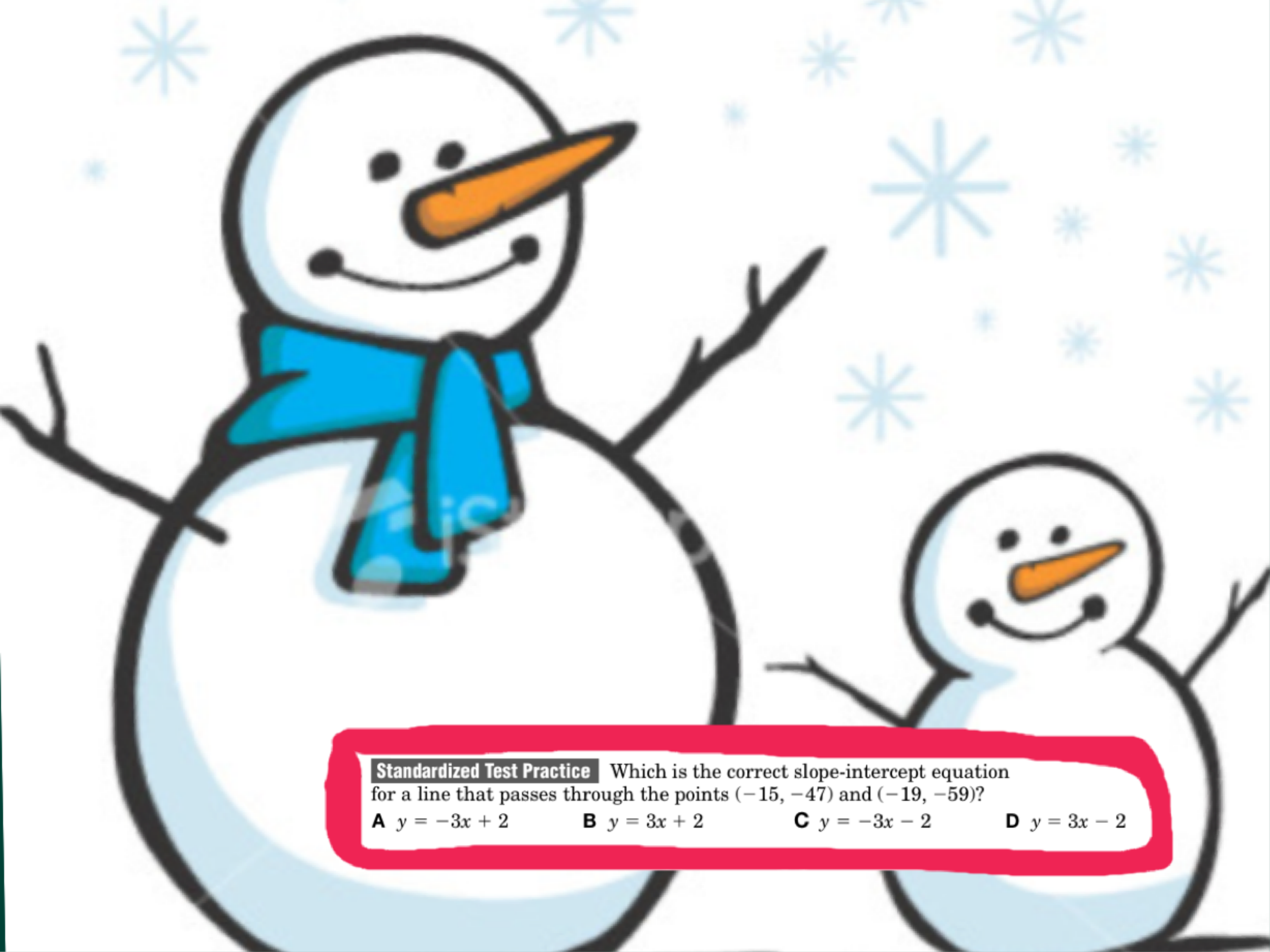
6. $(3, -4), (-6, -1)$

7. $(0, 7), (-2, 3)$

8. $(-10, 47), (5, -13)$

Answers: **1.** $y = 2x - 11$ **2.** $y = \frac{1}{2}x + 4$ **3.** $y = x - 2$ **4.** $y = -\frac{5}{4}x + \frac{27}{4}$ **5.** $y = \frac{1}{2}x + \frac{13}{2}$ **6.** $y = -\frac{1}{3}x - 3$ **7.** $y = 2x + 7$ **8.** $y = -4x + 7$ [redacted]





Standardized Test Practice Which is the correct slope-intercept equation for a line that passes through the points $(-15, -47)$ and $(-19, -59)$?

A $y = -3x + 2$ **B** $y = 3x + 2$ **C** $y = -3x - 2$ **D** $y = 3x - 2$

If you chose d you are correct!

Well done!