

Linear equations given the slope and a point

Writing Linear Equations

Remember the slope-intercept form of an equation is $y = mx + b$, where m is the slope and b is the y -intercept. This form can be helpful in finding the equation of a line given the slope and any point on the line. The point (x, y) is just substituted in for x and y in the equation. Also substituting the value of m in for the slope, you are left with b , which is the y -intercept. Once the slope and the y -intercept are found, the equation of the given line can be written.

$$\text{point } (5, 4), m = 2$$

$$y = mx + b$$

$$4 = 2(5) + b$$

$$4 = 10 + b$$

$$-6 = b$$

$$\text{point } (-2, 3), m = 4$$

$$y = mx + b$$

$$3 = 4(-2) + b$$

$$3 = -8 + b$$

$$11 = b$$

Solve each equation for b .

$$1. -3 = \frac{1}{2}(-4) + b$$

$$2. 4 = (-\frac{2}{3})(9) + b$$

$$3. -2 = (-\frac{3}{2})(-\frac{8}{3}) + b$$

$$4. -5 = 7(-2) + b$$

$$5. 6 = (7)(-1) + b$$

$$6. 7 = -9(-2) + b$$

Given the point and slope of each line, find the y -intercept.

$$7. (-4, 7), m = 3$$

$$8. (0, 1), m = 4$$

$$9. (-4, -2), m = -1$$

$$10. (-3, -5), m = -2$$

$$11. (4, 3), m = -3$$

$$12. (3, 1), m = -3$$

State the equation of each line using its slope and y -intercept in problems 7–12. Write the equation in slope-intercept form.

13.

14.

15.

16.

17.

18.

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

$$19. m = \frac{2}{3}, \text{ point } (3, 5)$$

$$20. m = -2, \text{ point } (-2, 6)$$