

# Point-Slope and Standard Form

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Q Quick Review

There are several ways to write the same line. **Point-slope form** is  $y - y_1 = m(x - x_1)$  — handy when you know the slope  $m$  and one point  $(x_1, y_1)$ . **Slope-intercept form** is  $y = mx + b$ , the easiest form for graphing. **Standard form** is  $Ax + By = C$ , where  $A$ ,  $B$ , and  $C$  are integers. You can switch between forms with algebra: distribute and solve for  $y$  to reach slope-intercept, or move terms around to reach standard form. They all describe the *same* line.

◊ **Example:** Write the equation of the line through  $(3, 5)$  with slope 2 in slope-intercept form.  
 ⇒ We're given a point and a slope, so point-slope form is the natural starting place. Plug in  $m = 2$ ,  $x_1 = 3$ ,  $y_1 = 5$ :  $y - 5 = 2(x - 3)$ . Now we just need to clean it up into  $y = mx + b$  form. Distribute the 2 on the right:  $y - 5 = 2x - 6$ . Then add 5 to both sides to get  $y$  alone:  $y = 2x - 1$ . That's the same line, now in the form that's easy to graph.

**Answer:**  $y = 2x - 1$

## PRACTICE

Write each line in the requested form.

- |  |       |                                     |       |
|--|-------|-------------------------------------|-------|
| 1. Point-slope: $m = 3$ , $(1, 2)$           | _____ | 11. $y = x - 7$ to standard form    | _____ |
| 2. Point-slope: $m = -2$ , $(4, 1)$          | _____ | 12. $y = 4x$ to standard form       | _____ |
| 3. Point-slope: $m = 1$ , $(0, 5)$           | _____ | 13. $2x + y = 8$ to slope-int       | _____ |
| 4. Point-slope: $m = \frac{1}{2}$ , $(2, 3)$ | _____ | 14. $3x - y = 6$ to slope-int       | _____ |
| 5. $y - 4 = 2(x - 1)$ to slope-int           | _____ | 15. $x + 2y = 10$ to slope-int      | _____ |
| 6. $y - 1 = 3(x - 2)$ to slope-int           | _____ | 16. $4x + 2y = 12$ to slope-int     | _____ |
| 7. $y + 2 = -1(x - 3)$ to slope-int          | _____ | 17. Slope of $3x + y = 9$           | _____ |
| 8. $y - 5 = \frac{1}{2}(x - 4)$ to slope-int | _____ | 18. Slope of $2x - 4y = 8$          | _____ |
| 9. $y = 2x + 6$ to standard form             | _____ | 19. $y$ -intercept of $x + y = 5$   | _____ |
| 10. $y = -3x + 4$ to standard form           | _____ | 20. $y - 0 = 5(x - 1)$ to slope-int | _____ |

## ◆ Word Problems

21. A line passes through the point  $(2, 7)$  with slope 3. Write its equation in slope-intercept form. \_\_\_\_\_
22. A taxi's cost line passes through  $(0, 4)$  and has slope 2. Write the equation in standard form. \_\_\_\_\_
23. A line is given in standard form as  $5x + 2y = 20$ . What is its slope and  $y$ -intercept? \_\_\_\_\_
24. A line through  $(1, 1)$  has slope  $\frac{1}{2}$ . Write the equation in slope-intercept form. \_\_\_\_\_



## Answer Keys

1.  $y - 2 = 3(x - 1)$

2.  $y - 1 = -2(x - 4)$

3.  $y - 5 = 1(x - 0)$

4.  $y - 3 = \frac{1}{2}(x - 2)$

5.  $y = 2x + 2$

6.  $y = 3x - 5$

7.  $y = -x + 1$

8.  $y = \frac{1}{2}x + 3$

9.  $2x - y = -6$

10.  $3x + y = 4$

11.  $x - y = 7$

12.  $4x - y = 0$

13.  $y = -2x + 8$

14.  $y = 3x - 6$

15.  $y = -\frac{1}{2}x + 5$

16.  $y = -2x + 6$

17.  $-3$

18.  $\frac{1}{2}$

19.  $5$

20.  $y = 5x - 5$

21.  $y = 3x + 1$

22.  $2x - y = -4$

23. slope  $-\frac{5}{2}$ ,  $y$ -intercept 10

24.  $y = \frac{1}{2}x + \frac{1}{2}$

### Step-by-Step Explanations

1. Plug into  $y - y_1 = m(x - x_1)$ :  $y - 2 = 3(x - 1)$ .2. Plug into the form:  $y - 1 = -2(x - 4)$ .3. Plug in:  $y - 5 = 1(x - 0)$ , which is just  $y - 5 = x$ .4. Plug in:  $y - 3 = \frac{1}{2}(x - 2)$ .5. Distribute:  $y - 4 = 2x - 2$ , then add 4:  $y = 2x + 2$ .6. Distribute:  $y - 1 = 3x - 6$ , then add 1:  $y = 3x - 5$ .7. Distribute:  $y + 2 = -x + 3$ , then subtract 2:  $y = -x + 1$ .8. Distribute:  $y - 5 = \frac{1}{2}x - 2$ , then add 5:  $y = \frac{1}{2}x + 3$ .9. Move the  $2x$  over:  $-2x + y = 6$ , or equivalently  $2x - y = -6$ .10. Add  $3x$  to both sides:  $3x + y = 4$ .11. Subtract  $x$  from both sides:  $-x + y = -7$ , or  $x - y = 7$ .12. Move  $4x$  over:  $-4x + y = 0$ , or  $4x - y = 0$ .13. Subtract  $2x$  from both sides:  $y = -2x + 8$ .14. Subtract  $3x$ :  $-y = -3x + 6$ , then multiply by  $-1$ :  $y = 3x - 6$ .15. Subtract  $x$ :  $2y = -x + 10$ , then divide by 2:  $y = -\frac{1}{2}x + 5$ .16. Subtract  $4x$ :  $2y = -4x + 12$ , divide by 2:  $y = -2x + 6$ .17. Solve for  $y$ :  $y = -3x + 9$ , so the slope is  $-3$ .18. Solve for  $y$ :  $-4y = -2x + 8$ , so  $y = \frac{1}{2}x - 2$ ; slope  $\frac{1}{2}$ .19. Solve for  $y$ :  $y = -x + 5$ , so the  $y$ -intercept is 5.20. Distribute:  $y = 5x - 5$  (the  $y - 0$  is just  $y$ ).21. Start with point-slope:  $y - 7 = 3(x - 2)$ . Distribute:  $y - 7 = 3x - 6$ , then add 7:  $y = 3x + 1$ .22. Slope-intercept is  $y = 2x + 4$ . Move the  $2x$  over:  $-2x + y = 4$ , or  $2x - y = -4$ .23. Solve for  $y$ :  $2y = -5x + 20$ , so  $y = -\frac{5}{2}x + 10$ . The slope is  $-\frac{5}{2}$  and the intercept is 10.24. Point-slope:  $y - 1 = \frac{1}{2}(x - 1)$ . Distribute:  $y - 1 = \frac{1}{2}x - \frac{1}{2}$ , then add 1:  $y = \frac{1}{2}x + \frac{1}{2}$ .

## Want Even More Practice? Check Out Our Other South Dakota SBAC Test Books!



### South Dakota SBAC Grade 8 Math Preparation Bundle

18 full-length practice tests across three books  
(5 + 6 + 7)

No repeated questions—maximum practice value!



**18 Tests!**  
**3 Books**  
**One Bundle**

**Important:** All our test books contain **unique, completely different tests** from each other! Each book offers fresh practice questions—no repeats!

#### 5 Practice Tests

- ✓ 5 complete practice tests with detailed explanations
- ✓ Perfect foundation for SBAC test preparation
- ✓ Builds confidence and test-taking skills
- ✓ High-quality questions aligned with state standards

**Start your practice journey!**

#### 6 Practice Tests

- ✓ 6 complete practice tests with detailed explanations
- ✓ **Unique tests**—different from the 5 tests book
- ✓ Perfect for more practice after mastering 5 tests
- ✓ Builds even more confidence and test-taking skills
- ✓ Same high-quality questions aligned with standards

**Take your practice to the next level!**

#### 7 Practice Tests

- ✓ 7 complete practice tests for maximum preparation
- ✓ **Unique tests**—different from 5 and 6 tests books
- ✓ The most comprehensive practice for Grade 8
- ✓ Ideal for students aiming for top scores
- ✓ Extensive practice builds mastery and confidence

**Go all the way with comprehensive practice!**