

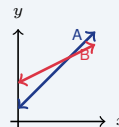
# Comparing Functions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 18

## Quick Review and Helpful Hints

To compare two functions, look at their *rate of change* (slope) and *starting value* (*y*-intercept). Functions may be given as equations, tables, or graphs – find each one's slope and intercept, then compare. A bigger slope rises faster.

▷ **Example:** Function A:  $y = 2x + 1$ . Function B goes through (0, 3) and (1, 4). Which has the greater slope? **Work:** A's slope is 2. B's slope =  $\frac{4-3}{1-0} = 1$ . Since  $2 > 1$ , A is steeper. ★ **Answer:** Function A



Compare slopes and intercepts.

### Practice Problems

Answer each comparison.

- |  |  |
|--|--|
| 1. Greater slope: $y = 3x + 1$ or $y = 2x + 5$ ? _____               | 8. Faster increase: $y = 2x$ or $y = 10x$ ? _____            |
| 2. Greater <i>y</i> -intercept: $y = 2x + 4$ or $y = 2x - 1$ ? _____ | 9. Greater slope: $y = x + 9$ or $y = 4x$ ? _____            |
| 3. Slope of $y = 5x - 2$ _____                                       | 10. <i>y</i> -intercept of a line through (0, 7) _____       |
| 4. <i>y</i> -intercept of $y = 5x - 2$ _____                         | 11. Slope of a horizontal line _____                         |
| 5. Slope from (0, 1), (1, 4) _____                                   | 12. Greater at $x = 1$ : $y = 2x + 1$ or $y = x + 5$ ? _____ |
| 6. <i>y</i> -intercept from (0, 1), (1, 4) _____                     | 13. Slope from table $x$ : 0, 1, $y$ : 2, 5 _____            |
| 7. Steeper: slope 4 or slope $-6$ ? _____                            | 14. Which increases: $y = -2x + 3$ or $y = 2x + 3$ ? _____   |

### Word Problems

15. Plan A charges \$2 per song; Plan B charges \$1.50 per song. Which has the lower rate? \_\_\_\_\_
16. Car A travels 50 mph and Car B travels 65 mph. Which has the greater rate? \_\_\_\_\_
17. Savings  $y = 10x + 5$  vs.  $y = 8x + 20$ . Which starts higher (greater *y*-intercept)? \_\_\_\_\_
18. At  $x = 2$ , which is larger:  $y = 3x$  or  $y = x + 5$ ? \_\_\_\_\_



## Answer Keys

1.  $y = 3x + 1$

2.  $y = 2x + 4$

3. 5

4. -2

5. 3

6. 1

7. slope -6

8.  $y = 10x$

9.  $y = 4x$

10. 7

11. 0

12.  $y = x + 5$

13. 3

14.  $y = 2x + 3$

15. Plan B

16. Car B

17.  $y = 8x + 20$

18.  $y = x + 5$

### Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Compare slopes 3 and 2:  $y = 3x + 1$  is steeper. So the final answer is  $y = 3x + 1$ .

2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Compare +4 and -1:  $y = 2x + 4$  is higher. So the final answer is  $y = 2x + 4$ .

3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The number with  $x$  is the slope: 5. So the final answer is 5.

4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The constant is the  $y$ -intercept: -2. So the final answer is -2.

5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Slope =  $\frac{4-1}{1-0} = 3$ . So the final answer is 3.

6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is At  $x = 0$ ,  $y = 1$ , so  $b = 1$ . So the final answer is 1.

7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Steepness uses size:  $|-6| = 6 > 4$ , so slope -6. So the final answer is slope -6.

8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Bigger slope rises faster:  $y = 10x$ . So the final answer is  $y = 10x$ .

9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Slopes 1 vs. 4:  $y = 4x$  is greater. So the final answer is  $y = 4x$ .

10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The point  $(0, 7)$  gives  $b = 7$ . So the final answer is 7.

11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A horizontal line has slope 0. So the final answer is 0.

12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is At  $x = 1$ : 3 vs. 6, so  $y = x + 5$ . So the final answer is  $y = x + 5$ .

13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Slope =  $\frac{5-2}{1-0} = 3$ . So the final answer is 3.

14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Positive slope increases:  $y = 2x + 3$ . So the final answer is  $y = 2x + 3$ .

15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is \$1.50 < \$2, so Plan B has the lower rate. So the final answer is Plan B.

16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $65 > 50$ , so Car B. So the final answer is Car B.

17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Compare 5 and 20:  $y = 8x + 20$  starts higher. So the final answer is  $y = 8x + 20$ .

18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is At  $x = 2$ : 6 vs. 7, so  $y = x + 5$ . So the final answer is  $y = x + 5$ .



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