

# Comparing Functions

Algebra 1 • Section 4.8

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

## Quick Review and Helpful Hints

A function pairs each input with exactly one output. Pay attention to what the input means, what rule is being applied, and whether the question asks for a value, a rule, a domain, or an interpretation.

▷ **Example:** For  $f(x) = 2x + 5$ , find  $f(4)$ .

**Work:** Replace  $x$  with 4:  $f(4) = 2(4) + 5 = 13$ .

★ **Answer:** 13

## ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- |                                                                                                                              |                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <p>1. Compare <math>f(x) = 3x + 2</math> and <math>g(x) = 5x - 4</math>. Which has greater rate of change?<br/>_____</p>     | <p>6. Function A has slope <math>-2</math>; Function B has slope 1. Which is increasing?<br/>_____</p>               |
| <p>2. Which has greater <math>y</math>-intercept: <math>y = 2x + 7</math> or <math>y = 4x - 1</math>?<br/>_____</p>          | <p>7. Compare <math>f(3)</math> for <math>f(x) = x + 8</math> and <math>g(x) = 4x - 1</math>.<br/>_____</p>          |
| <p>3. At <math>x = 4</math>, compare <math>f(x) = 2x + 1</math> and <math>g(x) = x^2 - 7</math>.<br/>_____</p>               | <p>8. Compare <math>f(5)</math> for <math>f(x) = 2x + 3</math> and <math>g(x) = x^2 - 10</math>.<br/>_____</p>       |
| <p>4. Which grows faster for large <math>x</math>: linear <math>4x + 9</math> or exponential <math>2^x</math>?<br/>_____</p> | <p>9. Which has smaller initial value: <math>a(x) = 10(1.2)^x</math> or <math>b(x) = 3x + 7</math>?<br/>_____</p>    |
| <p>5. A table increases by 6 when <math>x</math> increases by 2. Find the rate.<br/>_____</p>                                | <p>10. A graph crosses the <math>y</math>-axis at 6 and rises 2 per 1. Write a comparable linear rule.<br/>_____</p> |

## ◆ Word Problems

11. Plan A costs  $20 + 4m$  and Plan B costs  $12 + 6m$ . Which is cheaper at  $m = 3$ ?  
\_\_\_\_\_
12. Two savings plans are  $S_1 = 50 + 10w$  and  $S_2 = 20(1.2)^w$ . Which starts larger?  
\_\_\_\_\_



## Answer Keys

1.  $g$
2.  $y = 2x + 7$
3. They are equal
4.  $2^x$
5. 3
6. Function B
7. They are equal
8.  $g(5)$  is greater
9.  $b$
10.  $y = 2x + 6$
11. Plan B
12.  $S_1$

### Step-by-Step Explanations

1. Rate of change is just the slope. Since 5 beats 3,  $g$  climbs faster.
2. The intercept is the lone number, where the line meets the  $y$ -axis: 7 outranks  $-1$ .
3. Test both at 4:  $f$  gives 9 and  $g$  gives  $16 - 7 = 9$  — a perfect tie.
4. Linear plods along steadily, but exponentials snowball and eventually blow right past it.
5. Rate is output change over input change, so 6 divided by 2 gives 3 per step.
6. A positive slope means the line heads uphill, so B's slope of 1 is the one rising.
7. At  $x = 3$ ,  $f$  gives 11 and  $g$  gives  $12 - 1 = 11$ , so they meet right there.
8. Run both through 5:  $f$  reaches 13 while  $g$  edges ahead to 15.
9. Initial value lives at  $x = 0$ :  $a$  starts at 10,  $b$  starts at 7, so  $b$  begins lower.
10. Rising 2 per step is the slope and crossing at 6 is the intercept — snap them into  $y = 2x + 6$ .
11. At  $m = 3$ , Plan A rings up 32 and Plan B rings up 30, so B saves you money.
12. Set  $w = 0$  to see the starting point:  $S_1$  opens at 50 while  $S_2$  opens at just 20.



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