LESSON MAKER PRO

# Function Face-Off

*Compare linear functions by their rates, starting values, and outputs.*

**HIGH SCHOOL · MA.912.F.1**

**MA.912.F.1** "Understand, compare and analyze properties of functions."

NAME _____ DATE _____

## PRACTICE: COMPARE LINEAR FUNCTIONS

For a linear function y=mx+b, m tells how much the output changes when x increases by 1, and b is the output when x=0. To compare linear functions, find each rate and initial value, then evaluate the functions at the requested input when needed.

### WORKED EXAMPLE

For y=11x+17, identify the rate of change and initial value.

1. Write the rule in y=mx+b form.
2. Match m with 11.
3. Match b with 17.

**Answer: Rate of change: 11; initial value: 17.**

## PRACTICE 6 problems

**1** For f(x)=-3x+5, state the rate of change and the initial value.

**ANSWER** _____

**2** Function g is shown in the table. x: 0, 2, 4. g(x): 1, 7, 13. Find the rate of change and initial value.

**ANSWER** _____

**3** p(x)=2x-4. Function q is shown in the table. x: 0, 3, 6. q(x): 2, 8, 14. Which function has the greater initial value? Do the functions have the same rate of change?

**ANSWER** _____

**4** a(x)=5x+1 and b(x)=3x+9. Find the input where the functions have the same output. Then find that output.

**ANSWER** _____

**5** A linear function passes through (2,-1) and (6,7). Write its equation in the form y=mx+b.

**ANSWER** _____

**6** r(x)=-4x+6. Function s is shown in the table. x: -2, 0, 2. s(x): 9, 3, -3. Which function has the greater value when x=-2, and by how much?

**ANSWER** _____

## APPLY IT Show your work

**1** APPLY 1: Two esports clubs charge total dues based on the number of months m. Club A charges A(m)=4m+12 dollars. Club B charges B(m)=6m+2 dollars. After how many months will the total costs be equal? What will each total cost be?

WORK SPACE

**ANSWER** _____

**2** APPLY 2: Jay saves for a school trip using J(t)=8t+24, where t is weeks. Kai's savings are shown in the table. t: 0, 1, 2. K(t): 40, 46, 52. Who has more money after 3 weeks? When will their savings be equal?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

CHALLENGE: $h(x)=x^2-6x+8$ and $k(x)=2x-4$. For which integer values of x from 0 through 8 is h(x) greater than k(x)? Explain your reasoning.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Function Face-Off

**HIGH SCHOOL · MA.912.F.1**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | For f(x)=-3x+5, state the rate of change and the initial value. | **Rate of change: -3; initial value: 5.** |
| 2 | Function g is shown in the table. x: 0, 2, 4. g(x): 1, 7, 13. Find the rate of change and initial value. | **Rate of change: 3; initial value: 1.** |
| 3 | p(x)=2x-4. Function q is shown in the table. x: 0, 3, 6. q(x): 2, 8, 14. Which function has the greater initial value? Do the functions have the same rate of change? | **q has the greater initial value. Yes, both rates of change are 2.** |
| 4 | a(x)=5x+1 and b(x)=3x+9. Find the input where the functions have the same output. Then find that output. | **x=4, and both outputs are 21.** |
| 5 | A linear function passes through (2,-1) and (6,7). Write its equation in the form y=mx+b. | **y=2x-5** |
| 6 | r(x)=-4x+6. Function s is shown in the table. x: -2, 0, 2. s(x): 9, 3, -3. Which function has the greater value when x=-2, and by how much? | **r has the greater value by 5.** |

## PART 2 · APPLY IT

1. **After 5 months, each total cost is $32.** Set 4m+12 equal to 6m+2 and solve to get m=5. Substitute 5 into either function to get 32.
2. **After 3 weeks, Kai has $58 and has $10 more than Jay. Their savings will be equal after 8 weeks, when each has $88.** Kai's table has a rate of 6 and an initial value of 40, so K(t)=6t+40. Compare both functions at t=3, then solve 8t+24=6t+40.

## CHALLENGE

**x=0, 1, 7, and 8. Since $h(x)-k(x)=x^2-8x+12=(x-2)(x-6)$, the difference is positive when $x<2$ or $x>6$. The stated integer values are 0, 1, 7, and 8.**

Accept equivalent forms of the linear equation in problem 5. For comparison questions, accept correct values and conclusions supported by accurate rate, initial-value, or substitution work.