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

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.

_____

_____

ANSWER KEY

Function Face-Off

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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.