LESSON MAKER PRO

Function Face-Off

Compare functions shown in different ways.

HIGH SCHOOL · A2S.AF.F.15

A2S.AF.F.15 "Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Extend to polynomial, trigonometric (sine and cosine), logarithmic, radical..."

NAME _____ DATE _____

COMPARE THE SAME FEATURE

First, decide which feature you need to compare, such as an output, intercept, or maximum. Find that feature for each function, then compare the results.

WORKED EXAMPLE

Function f is $f(x)=x^2-50$. Function g is shown in the table. Which function has the greater output at x=9, and by how much?

FUNCTION G

x	g(x)
9	37

1. Find f(9): $9^2-50=31$.
2. Read the table: g(9)=37.
3. Compare: 37-31=6.

Answer: Function g, by 6.

PRACTICE 6 problems

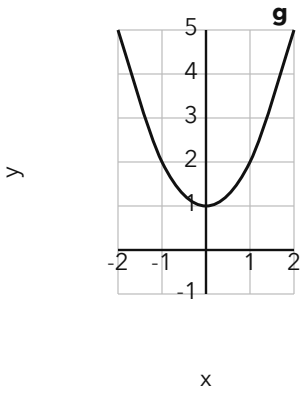
1 Function f is $f(x)=x^2-1$. Function g is shown in the table. At x=2, which function has the greater output, and by how much?

FUNCTION G

x	g(x)
0	2
1	3
2	5

ANSWER _____

2 Function f is f(x)=2x-1. Function g is shown on the graph. Which function has the greater y-intercept, and by how much?



ANSWER _____

3 For $0° \le x \le 360°$, $f(x)=2\cos(x)+1$. The table shows all outputs of g at the listed inputs. Which function has the greater maximum output over the inputs listed in the table, and by how much?

FUNCTION G

x	g(x)
0°	1
90°	4
180°	2
270°	0
360°	1

ANSWER _____

4 Function f is $f(x)=\log_2(x)$. Function g subtracts 3 from its input. Which function has the smaller positive x-intercept, and what is it?

ANSWER _____

5 Function f is $f(x)=\sqrt{(x+1)}$. Function g is shown in the table. At x=3, which function has the greater output, and by how much?

FUNCTION G

x	g(x)
0	1
3	4
7	5

ANSWER _____

6 When $x<2$, function p adds 3 to its input. When $x \ge 2$, it doubles its input and subtracts 1. Function q is $q(x)=x^2-2$. At x=2, which function has the greater output, and by how much?

ANSWER _____

APPLY IT Show your work

1 Two student creators track views after t days. Creator A models views in tens with $A(t)=t^2+2t+1$. Creator B's views in tens are shown in the table. After 3 days, who has more views, and how many more?

CREATOR B, VIEWS IN TENS

t (days)	B(t)
0	2
1	5
2	10
3	19

ANSWER _____

2 Your club needs 4 stickers. At a school booth, the total cost C(x) is $5 per sticker when $x \le 2$. When $x > 2$, the first 2 cost $10 total, and each additional sticker costs $3. An online shop charges $4 per sticker plus $3 shipping. Which option costs less for 4 stickers, and by how much?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Function f is $f(x)=x^2$. For inputs below 2, function g outputs 2 more than the input. For inputs at least 2, it outputs 2 less than triple the input. Find every x where $f(x)=g(x)$. Explain how you checked that each answer fits the correct part of g.

WORK SPACE AND ANSWER

ANSWER KEY

Function Face-Off

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Function f is $f(x)=x^2-1$. Function g is shown in the table. At x=2, which function has the greater output, and by how much?	**Function g, by 2.**
2	Function f is $f(x)=2x-1$. Function g is shown on the graph. Which function has the greater y-intercept, and by how much?	**Function g, by 2.**
3	For $0°\le x\le 360°$, $f(x)=2\cos(x)+1$. The table shows all outputs of g at the listed inputs. Which function has the greater maximum output over the inputs listed in the table, and by how much?	**Function g, by 1.**
4	Function f is $f(x)=\log_2(x)$. Function g subtracts 3 from its input. Which function has the smaller positive x-intercept, and what is it?	**Function f; its x-intercept is x=1.**
5	Function f is $f(x)=\sqrt{(x+1)}$. Function g is shown in the table. At x=3, which function has the greater output, and by how much?	**Function g, by 2.**
6	When $x<2$, function p adds 3 to its input. When $x\ge 2$, it doubles its input and subtracts 1. Function q is $q(x)=x^2-2$. At x=2, which function has the greater output, and by how much?	**Function p, by 1.**

PART 2 · APPLY IT

1. **Creator B has 30 more views.** A(3)=16 tens of views, while B(3)=19 tens. The difference is 3 tens, or 30 views.
2. **The school booth costs $3 less.** The booth costs $10+2($3)=$16. The online shop costs 4($4)+$3=$19.

CHALLENGE

x=-1 and x=2. For $x<2$, $x^2=x+2$ gives -1 or 2, but only -1 is below 2. For $x\ge 2$, $x^2=3x-2$ gives 1 or 2, but only 2 is at least 2.

Accept answers that identify the correct function and difference without a full sentence. In the challenge, students must reject solutions that do not satisfy the condition for the part of g they used.