Composite Functions

See Group Work Day

for HW answers

Wed OCC Registration deadline is Today

Share current roster

Today Open House 6-8pm

Tues 9/24 1st Math League Meeting in LGR 2:30pm

Next Tues Quiz 2

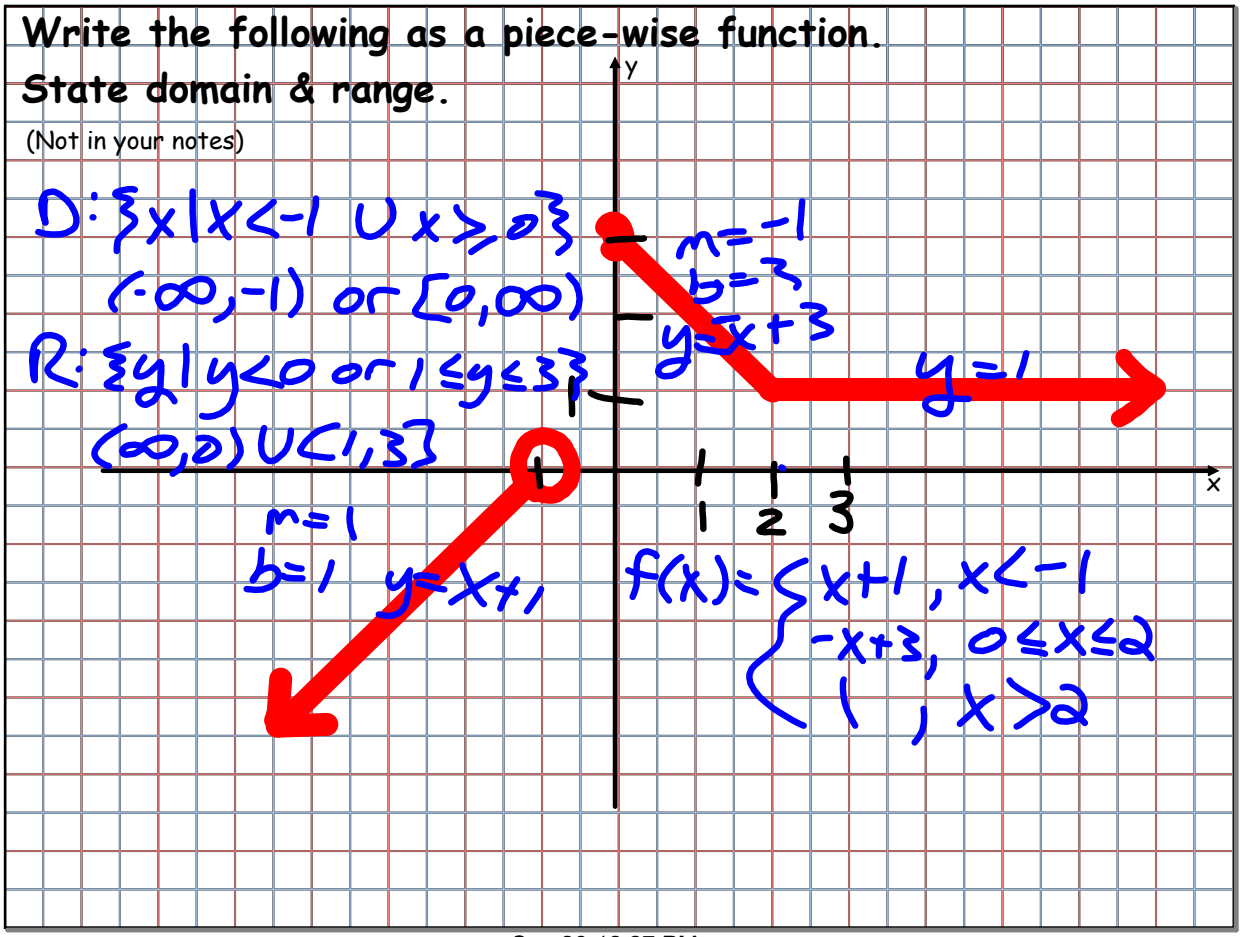
Next Thurs GHW2 Due

Next Friday Test

Sep 8-4:43 PM

Write the following as a piece-wise function.
State domain & range.

(Not in your notes)



Sep 26-12:27 PM

Warm-Up: Multiply

1. $(x - 1)^2$ $x^2 - 2x + 1$ Answer

2. $2(x - 1)^2$ $2x^2 - 4x + 2$ Answer

3. $(2x - 1)^2$ $4x^2 - 4x + 1$ Answer

Aug 22-10:00 AM

Rules of Composition – Domain of the composite is dependent on the domains of f and g.

$(f + g)(x) = f(x) + g(x)$

$(f - g)(x) = f(x) - g(x)$

$(f \cdot g)(x) = f(x) \cdot g(x)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

$(f \circ g)(x) = f(g(x))$

$(g \circ f)(x) = g(f(x))$

Aug 22-10:04 AM

1. If $f(x) = x^2 - 1$ and $g(x) = 2x - 4$, find each of the following.

a. $(f + g)(2) =$
$= f(2) + g(2)$
$= 2^2 - 1 + 2(2) - 4$
$= 3 + 0 = 3$

b. $f(g(2)) =$ $f(2(2) - 4)$
$= f(0) = 0^2 - 1$
$= -1$

c. $(f - g)(3) =$ $f(3) - g(3)$
$= 3^2 - 1 - [2(3) - 4]$
$= 8 - 2 = 6$

d. $f(2x) =$ $(2x)^2 - 1$
$= 4x^2 - 1$

e. $g(3x+1) =$ $2(3x+1) - 4$
$= 6x + 2 - 4$
$= 6x - 2$

f. $\left(\frac{f}{g}\right)(3) = \frac{f(3)}{g(3)} = \frac{3^2 - 1}{2(3) - 4} = \frac{8}{2}$
$= 4$

Aug 22-10:05 AM

For 2 & 3, State domain restrictions if they exist and find the indicated compositions.

2. $f(x) = 3x$ and $g(x) = 2x^2 - 2$

a. $(f + g)(x) =$ $f(x) + g(x)$
$= 3x + 2x^2 - 2$
$= 2x^2 + 3x - 2$

b. $(f - g)(x) =$ $f(x) \cdot g(x)$
$= 3x - (2x^2 - 2)$
$= 3x - 2x^2 + 2$
$= -2x^2 + 3x + 2$

c. $(f \bullet g)(x) =$ $f(x) \cdot g(x)$
$= 3x(2x^2 - 2)$
$= 6x^3 - 6x$

d. $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{3x}{(2x^2 - 2)} = \frac{3x}{2(x^2 - 1)}$
$= \frac{3x}{2(x+1)(x-1)} \neq 0$ $x \neq \pm 1$
$x \neq -1 \quad x \neq 1$

e. $(f \circ g)(x) =$ $f(g(x))$
$= f(2x^2 - 2)$
$= 3(2x^2 - 2) = 6x^2 - 6$

f. $(g \circ f)(x) =$ $g(f(x))$
$= g(3x) = 2(3x)^2 - 2$
$= 2(9x^2) - 2$
$= 18x^2 - 2$

Aug 22-10:05 AM

Remember HW

3. $f(x) = x + 7$ and $g(x) = 2x - 3$

a. $(f + g)(x) = f(x) + g(x)$
$= x + 7 + 2x - 3$
$= 3x + 4$

b. $(g - f)(x) = g(x) - f(x)$
$= 2x - 3 - (x + 7)$
$= 2x - 3 - x - 7$
$= x - 10$

c. $(f \bullet g)(x) = f(x) \cdot g(x)$
$= (x + 7)(2x - 3)$
$= 2x^2 - 3x + 14x - 21$
$= 2x^2 + 11x - 21$

d. $\left(\frac{g}{f}\right)(x) = \frac{g(x)}{f(x)} = \frac{2x - 3}{x + 7}, x \neq -7$

e. $(f \circ g)(x) = f(g(x))$
$= f(2x - 3) = (2x - 3) + 7$
$= 2x + 4$

f. $(g \circ f)(x) = g(f(x))$
$= g(x + 7) = 2(x + 7) - 3$
$= 2x + 14 - 3 = 2x + 11$

Aug 22-10:05 AM

Sep 17-8:25 PM