Checkpoint today

$f(x) = 2x - 1$

$g(x) = 3x + 7$

$(f \circ g)(x)$

$f(g(x))$

$f(3x+7)$

$2x - 1 = f(x)$

$2(3x+7) - 1 = f(3x+7)$

$6x + 14 - 1$

$\boxed{6x + 13}$

$(g \circ f)(x)$

$g(f(x))$

$g(2x-1)$

$3(2x-1) + 7$

$6x - 3 + 7$

$\boxed{6x + 4}$

Quiz #2 Review Key on Following pages

roginskimath.weebly.com

#1 composition of functions

$f(a) = 3a$

$g(a) = 2a+3$

Find $(f \circ g)(8) = f(g(8))$

work right to left or inside out

$g(8) = 2(8)+3 = 19$

$f(19) = 3(19) = \boxed{57}$

#2 $g(t) = 2t+5$

$h(t) = t^2+3t$

Find $(g \circ h)(-2)$

$h(-2) = (-2)^2+3(-2) = 4-6 = -2$

$g(-2) = 2(-2)+5 = -4+5 = \boxed{1}$

#3 Composition of functions

$h(x) = x+2$
$g(x) = x^2-5$

Find $(h \circ g)(x) = h(g(x))$

$= h(x^2-5)$

$= (x^2-5)+2$

$(h \circ g)(x) = \boxed{x^2-3}$

#4

$g(x) = x^2+5x$
$h(x) = 4x-1$

FIND $(g \circ h)(x)$

$g(h(x))$

$g(4x-1)$

$(4x-1)^2+5(4x-1)$

$(4x-1)(4x-1)+5(4x-1)$

$16x^2-4x-4x+1+20x-5$ ← combine like terms

$\boxed{16x^2+12x-4 = g(h(x))}$

#5 ARE the following functions 'inverses?

$g(x) = -5 + \frac{7}{5}x$

$f(x) = \frac{5}{7}x + \frac{25}{7}$

> Pick 1 of these equations and find inverse

$g(x) = -5 + \frac{7}{5}x$ → replace $g(x)$ with y

$y = -5 + \frac{7}{5}x$ → switch locations of x & y

$x = -5 + \frac{7}{5}y$

PEMDAS

$+5 \quad +5$

$5(x+5) = \frac{7}{5}y \cdot 5 = \frac{7y}{5} \cdot 5$

$\frac{5x+25}{7} = \frac{7y}{7}$

$y = \frac{5x+25}{7} = \frac{5x}{7} + \frac{25}{7} = f(x)$

Yes, the functions are 'inverses' //

Ex: $\frac{5x+8}{4} = \frac{5x}{4} + \frac{8}{4} = \boxed{\frac{5x}{4} + 2}$

#6 ARE the following functions inverses?

$g(x) = \frac{-2x-1}{3}$

$y = \frac{-2x-1}{3}$

$x = \frac{-2y-1}{3}$

$3x = -2y-1$

$3x+1 = -2y$

$\frac{3x+1}{-2} = y$

$f(x) = \frac{5x-5}{4}$

$y = \frac{5x-5}{4}$

$x = \frac{5y-5}{4}$

$4x = 5y-5$

$4x+5 = 5y$

$\frac{4x+5}{5} = y$

They are NOT inverses.

#7 $g(x) = \frac{3x-6}{4}$

write g(x) as y

$y = \frac{3x-6}{4}$

Switch x and y

$x = \frac{3y-6}{4}$

multiply by 4

$4x = 3y - 6$

add 6

$4x + 6 = 3y$

divide by 3

$\frac{4x+6}{3} = y$

#8 $\dfrac{3x^4+5x^3+18x^2}{9x^2}$

Dividing by a monomial (1 term)
make separate fractions

$\dfrac{3x^4}{9x^2}+\dfrac{5x^3}{9x^2}+\dfrac{18x^2}{9x^2}$

$\dfrac{x\cdot x(x\cdot x)}{x\cdot x}$

$\boxed{\dfrac{1x^2}{3}+\dfrac{5x}{9}+2}$

Simplify each Fraction by itself...

#9 Dividing by a monomial (1 term)

$$\frac{45x^3+x^2+x}{9x^3}$$

$$\frac{45x^3}{9x^3}+\frac{x^2}{9x^3}+\frac{x}{9x^3}$$

$$5\frac{\cancel{x\cdot x\cdot x}}{\cancel{x\cdot x\cdot x}}\quad\frac{\cancel{x\cdot x}}{9\cancel{x\cdot x}\cdot x}\quad\frac{\cancel{x}}{9\cdot x\cdot x\cdot\cancel{x}}$$

$$\boxed{5+\frac{1}{9x}+\frac{1}{9x^2}}$$

#10 Dividing using Long Division and box chart

$18x^3+68x^2-25x-5 \div (9x-2)$

$$\begin{array}{r} 2x^2+8x-1 \\ 9x-2 \overline{)\ 18x^3+68x^2-25x-5} \\ -(18x^3-4x^2) \\ \hline 72x^2-25x \\ -(72x^2-16x) \\ \hline -9x-5 \\ -(-9x+2) \\ \hline -7 \end{array}$$

remainder

$2x^2+8x-1-\frac{7}{(9x-2)}$

$18x^3+65x^2-25x-5$

divisor			
$9x$	$18x^3$	$72x^2$	$-9x$
-2	$-4x^2$	$16x$	2

$2x^2$ $8x$ -1 - answer

-7 - remainder

Dividend - what you are dividing

#11

$$3x-8 \overline{)\,3x^3+22x^2-110x+75}$$

$$x^2+10x-10$$

$$-(3x^3-8x^2)$$

$$30x^2-110x$$

$$-(30x^2-80x)$$

$$-30x+75$$

$$-(-30x+80)$$

$$-5$$

$$x^2+10x-10-\frac{5}{3x-8}$$

#12 Dividing by a binomial (2 terms)

LD

$4x^3-28x^2+33x+30 \div (x-5)$

↑ divisor has a 1 in front of x

Box Chart Synthetic

USE synthetic

5	4	−28	33	30
mult.	↓	+20	−40	−35
	4	−8	−7	−5

↑ remainder

$4x^2-8x-7 \quad \frac{-5}{(x-5)}$

#13 Dividing by a binomial (2 terms)

ex: $(3x-4)$ $(x+7)$

Long Division, Box Charts

Synthetic

$x^3-19x^2+94x-32 \div (x-10)$

$$\begin{array}{r|rrrr} 10 & 1 & -19 & 94 & -32 \\ & \downarrow & +10 & -90 & +40 \\ \hline & 1 & -9 & 4 & 8 \end{array}$$

8 ← remainder

$$x^2-9x+4+\frac{8}{(x-10)}$$