Unit 2 (2.3) Compositions Notes

<u>Compositions:</u> the range of the first function becomes the domain of the second function…a series of substitutions

Recall:

if $f(x) = x^2 - 2x + 7$

then $f(5) = (5)^2 - 2(5) + 7$

so $f(5) = 22$

In other words: if the input is 5 the output is 22; $(\mathbf{5}, \mathbf{22})$

<u>To do a composition you will do substitution TWICE</u>

$g(x) = 3x - 4$ and $f(x) = x^2 - 2x + 7$

$g(f(5))$ ←do $f(5)$ first (see above), since $f(5) = 22$ substitute 22 in the place of $f(5)$

$g(22) \to 3(22) - 4$ ←do $g(22)$ second

$g(22) = 62$

Try $f(g(5))$

More Examples: $f(x) = -8x + 2$ $\quad$ $g(x) = 2x^2 - 4$ $\quad$ $h(x) = \frac{5x-2}{4}$

1. $f(h(6))$
2. $h(f(6))$
3. $g(f(-2))$
4. $f(g(-2))$

Compositions of Functions: keep in mind it is just substitution

$f(x) = 4x$ $\quad g(x) = 2x - 4$ $\quad h(x) = x^2 + 1$ $\quad j(x) = \frac{1}{2}x + 2$

1. $f(g(x))$

2. $g(f(x))$

3. $g(h(x))$

4. $h(g(x))$

5. $g(j(x))$

6. $j(g(x))$

7. $g(g(x))$