Occidental College Department of Mathematics
Gateway – Functions (practice)

Course: _____ Date: _____ Name: _____

Neatly present all of your work on this (or additional) sheets.

1.-3. The function Q is given by the formula $Q(x) = 3x^2 + 2x$.

1. Find $Q(-3)$

2. Find $Q(a + b)$

3. Find $\dfrac{Q(x + \Delta x) - Q(x)}{\Delta x}$

4. For the functions $f(x) = x^2$ and $g(x) = x^{\frac{1}{3}} - 2$, find $(f \circ g)(x) = f(g(x))$.

5. Find functions $f(x)$ and $g(x)$ so that $h(x) = \sqrt{3x^2 - 2x}$ is the composition $(g \circ f)(x) = g(f(x))$.

6. Write an expression for the following statement: The function G is four times the sum of the functions j and k.

7. Let $f(x) = x^2$, $g(x) = x^{\frac{1}{3}}$ and $h(x) = 3x - 1$. Find an formula for $\left(\dfrac{g-h}{g-f}\right)(x)$.

8. The table below contains values of the functions f and g for the given x-values:

x	$f(x)$	$g(x)$
-2	3	17
-1	2	2
0	1	8
1	0	5
2	-1	3

Find $(2g \times f)(2)$.

9. Find the domain of the function $w(x) = \dfrac{\sqrt{x-1}}{x-2}$.

10. Given the function $P(x, y) = \sqrt{x^2 + y^2}$ and the constraint that $y^2 = x$ for all x, express the function P as a function of one variable.