MAT 161 – CLASS NOTES – Section 2.6: Combinations of Functions; Composite Functions

1) Find the domain of each function.

a) $f(x)=x^2-6x+3$

b) $f(x)=\dfrac{5}{x-6}$

c) $f(x)=\sqrt{x+3}$

2) **Algebra of Functions**

For all values of x for which both $f(x)$ and $g(x)$ are defined, we define the following functions:

a) **Sum:** $f+g=(f+g)(x)=f(x)+g(x)$

b) **Difference:** $f-g=(f-g)(x)=f(x)-g(x)$

c) **Product:** $fg=(fg)(x)=f(x)g(x)$

} The domain of each is the intersection (overlap) of the domains of f and g.

d) **Quotient:** $\dfrac{f}{g}=\left(\dfrac{f}{g}\right)(x)=\dfrac{f(x)}{g(x)}$ } The domain is as above except for all values of x that will make the denominator 0.

3) Find the four algebraic functions and their domains where $f(x)=x^2+4x+1$ and $g(x)=x+2$.

a) $f+g$

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b) $f-g$

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c) fg

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d) $\frac{f}{g}$

4) Find the four algebraic functions and their domains where $f(x)=x^2+4$ and $g(x)=\sqrt{7-x}$.

a) $f+g$

b) $f-g$

c) fg

d) $\frac{f}{g}$

5) Evaluate the indicated function for $f(x)=2x+5$ and $g(x)=x^2-3$.

a) $(f-g)(-1)$

b) $(fg)(-3)$

c) $\left(\frac{f}{g}\right)(2)$

6) **Composite Functions**

For functions f and g, the **composite function** of f and g is given by:

$$f \circ g = (f \circ g)(x) = f(g(x)) \qquad \text{reads} \quad \text{“}f \text{ composed with } g\text{”}$$

7) **Domain of a composite function** – the intersection of the domain of itself and its inside function.

8) Find $f \circ g$ and $g \circ f$ and give the domain of each.

a) $f(x) = x^2 + 3; g(x) = \sqrt{x+2}$

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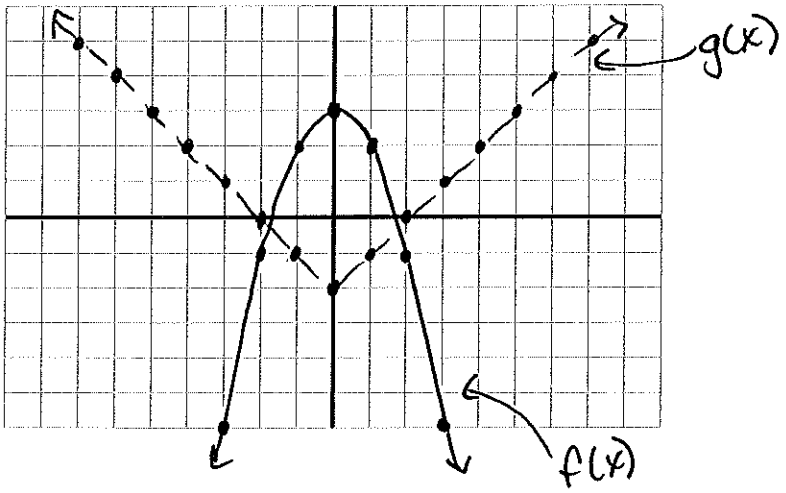
b) $f(x) = x + 4; g(x) = \frac{1}{x}$

9) Given $f(x)=2x+3; g(x)=x-4$, find $(f\circ g)(-2)$

10) Given the graph below, find the following:



a) $(f+g)(-3)$

b) $(g-f)(2)$

c) $(fg)(-1)$

d) $(f\circ g)(1)$

e) $(g\circ f)(3)$