

# Math 1050 ~ College Algebra

## 4 Combinations of Functions

### EX 1

Evaluate this function at the given expressions, simplifying your answer.

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

#### 1a)

$$f(-3)$$

#### 1b)

$$f(x - 2)$$

#### 1c)

$$f(x^{-2})$$

#### 1d)

$$f(x^2 + 1)$$

It is also possible to perform arithmetic operations on functions.

Sum

Difference

Product

Quotient

Composition

### EX 2

For  $f(x) = \sqrt{x-1}$ , and  $g(x) = \frac{x}{x^2-4}$ , simplify the resulting function and determine the domain.

**2a)**

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

**2b)**

$$(f - g)(5)$$

**2c)**

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

### **EX 3**

For the two functions above, find

**3a)**

$f(g(x))$  (include domain)

**3b)**

$g(f(x))$  (include domain)

### **EX 4**

For  $f(x) = 3x + 5$ , find  $(f \circ f)(x)$  and its domain.

In calculus, one frequently is required to find a difference quotient,  $\frac{f(x+h)-f(x)}{h}$ .

### **EX 5**

Find the difference quotient for each of these.

#### **5a)**

$$f(x) = 3x + 5$$

#### **5b)**

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

## **Decomposing Functions**

### **EX 6**

Find two functions  $f$  and  $g$  such that  $f(g(x)) = h(x)$  where  $h(x) = \frac{3}{(5x+1)^2}$ .