**Activity 1.5.2 Domains and Graphs of Composite FUNctions**

In this Activity, we will explore the domain and range of composite functions.

1. If f(x) = 2x – 1 and g(x) = , find the following:

a) The domain of f(x): e) The domain of g(x):

b) (f $∘$ g)(x) = f) (g $∘$ f)(x) =

c) the domain of (f $∘$ g)(x): g) the domain of (g $∘$ f)(x):

d) Graph f(x), g(x) and (f $∘$ g)(x) on the same h) Graph f(x), g(x) and (g $∘$ f)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

1. (f $∘$ f)(x) = l) (g $∘$ g)(x) =

j) the domain of (f $∘$ f)(x): m) the domain of (g $∘$ g)(x):

k) Graph f(x), g(x) and (f $∘$ f)(x) on the same n) Graph f(x), g(x) and (g $∘$ g)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

1. If f(x) = 3x – 2 and g(x) = , find the following:

a) The domain of f(x): e) The domain of g(x):

b) (f $∘$ g)(x) = f) (g $∘$ f)(x) =

c) the domain of (f $∘$ g)(x): g) the domain of (g $∘$ f)(x):

d) Graph f(x), g(x) and (f $∘$ g)(x) on the same h) Graph f(x), g(x) and (g $∘$ f)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

i) (f $∘$ f)(x) = l) (g $∘$ g)(x) =

j) the domain of (f $∘$ f)(x): m) the domain of (g $∘$ g)(x):

k) Graph f(x), g(x) and (f $∘$ f)(x) on the same n) Graph f(x), g(x) and (g $∘$ g)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

1. If f(x) = x2 +1 and g(x) = $\sqrt{x}$, find the following:

a) The domain of f(x): e) The domain of g(x):

b) (f $∘$ g)(x) = f) (g $∘$ f)(x) =

c) the domain of (f $∘$ g)(x): g) the domain of (g $∘$ f)(x):

d) Graph f(x), g(x) and (f $∘$ g)(x) on the same h) Graph f(x), g(x) and (g $∘$ f)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

i) (f $∘$ f)(x) = l) (g $∘$ g)(x) =

j) the domain of (f $∘$ f)(x): m) the domain of (g $∘$ g)(x):

k) Graph f(x), g(x) and (f $∘$ f)(x) on the same n) Graph f(x), g(x) and (g $∘$ g)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

1. If f(x) = 2x - 5 and g(x) = , find the following:

a) The domain of f(x): e) The domain of g(x):

b) (f $∘$ g)(x) = f) (g $∘$ f)(x) =

c) the domain of (f $∘$ g)(x): g) the domain of (g $∘$ f)(x):

d) Graph f(x), g(x) and (f $∘$ g)(x) on the same h) Graph f(x), g(x) and (g $∘$ f)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

i) (f $∘$ f)(x) = l) (g $∘$ g)(x) =

j) the domain of (f $∘$ f)(x): m) the domain of (g $∘$ g)(x):

k) Graph f(x), g(x) and (f $∘$ f)(x) on the same n) Graph f(x), g(x) and (g $∘$ g)(x) on

 coordinate plane. (Use different colors the same coordinate plane.

 if possible.) (Use different colors if possible.)

1. Given the “composite” function F below, find two functions, f and g, such that F is equal to. (This is called “decomposing the function.”) *Note: For some functions, there is more than one pair of functions f and g that work!*

Example: Given: F(x) = , f(x) = , g(x) = x + 5

|  |  |  |
| --- | --- | --- |
| $F\left(x\right)=(x+4)^{2}$  | $$F\left(x\right)=\frac{1}{x-5}$$ | $$F\left(x\right)=\left(x+2\right)^{3}-\left(x+2\right)+3$$ |
| $f\left(x\right)=$  | $f\left(x\right)=$  | $f\left(x\right)=$  |
| $g\left(x\right)=$  | $g\left(x\right)=$  | $g\left(x\right)=$  |

|  |  |  |
| --- | --- | --- |
| $F\left(x\right)=\frac{3}{\sqrt{7x-4}}$  | $$F\left(x\right)=\frac{x^{3}}{x^{3}+6}$$ | $$F\left(x\right)=\sqrt{x-8}-9$$ |
| $f\left(x\right)=$  | $f\left(x\right)=$  | $f\left(x\right)=$  |
| $g\left(x\right)=$  | $g\left(x\right)=$  | $g\left(x\right)=$  |