## Topic 5.5 Function Operations

Essential Question:
How do you combine, multiply, divide, and compose functions, how do you find the domain of the resulting function?

## Model \& Discuss

Complete online.

## CONCEPT: Composite Function

A composite function is the result of applying the rule for one function, $f$, to the rule of another function, $g$. The new rule is denoted as $f \circ g$.

$$
(f \circ g)(x)=f(g(x))
$$

The operation othat forms a composite functions is called composition of functions.

The domain of $f \circ g$ is the set of all real numbers $x$ in the domain of $g$ such that $g(x)$ is in the domain of $f$.

So the domain of the composition is the intersection of the domains of $g$ and $f \circ g$, but not $f$.

## CONCEPT SUMMARY

## Function Operations

|  | Add or Subtract <br> Functions | Multiply or Divide <br> Functions |
| :--- | :--- | :--- |
|  |  | Compose Functions |

Q: How do operations on functions relate to what you have learned before?

## Examples \& Questions <br> Examples 1

Q: How do you combine functions by addition or subtraction?
Q: How do you know that the combined function has the same domain as the two original functions?
Q: What new notation is used in the example and what does it mean?

## Examples 2

Q: How does the example involve multiplying functions?
Q: How do you multiply two function?
Q: For the demand function $d(x)$ and the price function $p(x)$, is $d(x) \cdot p(x)$ equal $p(x)$. $d(x)$ ?

## Examples 3

Q: How are the domains of $g$ and $\frac{f}{g}$ different?

## Examples 4

Q: What is the difference between the two notations $f(x) \cdot g(x)$ and $f(g(x))$ ?

## Examples 5

Q: What notation is introduced in the example and what does it mean?
Q: What procedure do you perform to find the rule for $f \circ g$ ?

Examples 6
Q: Why does order matter for discounts?
Prackice and Problem Solving
Complete MathXL for School: Practice and Problem Solving (online)
Complete MathXL for School: Enrichment (online)

Challenge: \#16, 32 - key will be posted in Power School Learning.

Lesson Quiz 5.5/Notes

