**M – Functions, Lesson 4, Operations with Functions (r. 2018)**

FUNCTIONS

Operations with Functions

|  |  |
| --- | --- |
| **Common Core Standard**  **F-BF.1** Write a function that describes a relationship between two quantities. | **Next Generation Standard**  **AI-F.BF.1** Write a function that describes a relationship between two quantities. |

**LEARNING OBJECTIVES**

Students will be able to:

1) Compose new functions from existing functions using substitution and mathematical operations.

**Overview of Lesson**

|  |  |
| --- | --- |
| **Teacher Centered Introduction**  **Overview of Lesson**  **- activate students’ prior knowledge**  **- vocabulary**  **- learning objective(s)**  **- big ideas: direct instruction**  **- modeling** | **Student Centered Activities**  **guided practice Teacher: anticipates, monitors, selects, sequences, and connects student work**  **- developing essential skills**  **- Regents exam questions**  **- formative assessment assignment (exit slip, explain the math, or journal entry)** |

**VOCABULARY**

**LEARNING OBJECTIVES**

Students will be able to:

1. Use the output of one function as the input for another function.
2. Substitute expressions from one function into another.

**BIG IDEAS**

Polynomial expressions can be substituted into equations and functions.

Example:

Given that:  and , then 

**Functions can be multiplied or divided** if each and every term in both expressions is multiplied or divided by the same value.

Example: 

**DEVELOPING ESSENTIAL SKILLS**

1. If f and g are two functions defined by  and , then  is

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

2. If  and , then  is equal to

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. | 7 |

3. The accompanying tables define functions f and g.

**

**

What is?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 6 | c. | 8 |
| b. | 2 | d. | 4 |

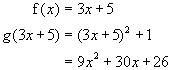
4. If  and *,* what is the value of ?

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. | 8 |
| b. | 2 | d. | 13 |

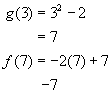
5. If  and , find .

**ANSWERS**

1. ANS: B



2. ANS: A



3. ANS: C

f(3) = 5, g(5) = 8

4. ANS: C

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5. ANS:

5. *. .*

**REGENTS EXAM QUESTION (through June 2018)**

A.APR.A.1: Operations with Functions

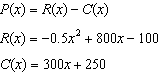
434) A company produces *x* units of a product per month, where  represents the total cost and  represents the total revenue for the month. The functions are modeled by  and . The profit is the difference between revenue and cost where . What is the total profit, , for the month?

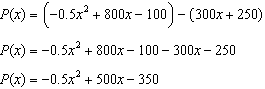
|  |  |  |  |
| --- | --- | --- | --- |
| 1) |  | 3) |  |
| 2) |  | 4) |  |

**SOLUTION**

434) ANS: 2

Strategy: Substitute  and  into .

Given: 

Therefore: 

PTS: 2 NAT: A.APR.A.1 TOP: Addition and Subtraction of Polynomials

KEY: subtraction