*Review 5.1-5.3 (****Key****)*

1. Determine if the graph represents a one-to-one function.

**The given graph does not represent a one-to-one function; it does not pass the horizontal line test. For example, if we examine the coordinates and , both *x*-values have**

***y*-coordinate 5 (see graph below). In a one-to-one function, any two different inputs will produce two different outputs. So, a horizontal line cannot intersect the graph more than once, which is not the case here.**



2. Determine if the graph represents a function that has an inverse; explain your decision.

**The given graph represents a function that has an inverse; no horizontal line will intersect the graph more than once.**

3. Given , find the domain of the inverse.

**The inverse of the given function is found by interchanging the *x*-and *y*-coordinates:**

**. The domain, D, of the inverse is D = {15, 7, 5, 12}**

4. Find the inverse function for = .

**Replace with "*y*," interchange the *x* and the *y*, then solve the new equation for *y*; assign name to the resulting inverse function:**

 **(9) (9)**

5. Given the graph of , graph its inverse along with *y* = *x*; label the inverse .

**The graphs of a function and its inverse are symmetric about the line *y* = *x*. Therefore, since the points lie on the graph of , we know that the points will lie on the graph of the inverse, .**



6. Luis bought a new car and the total loan (all charges included) is $over a 48 month period. His monthly payment will be $422, with the outstanding amount denoted by

 = , where is the number of months paid towards the loan.

 a. Find and interpret its meaning.

 b.  Find the inverse of the given function.

 c. Find and interpret its meaning.

 **a. = =**

 **After the 26th payment, the outstanding car loan amount is**

 **b.**

 **c. =**

 **If the outstanding amount is , Luis has paid the loan for 45 months.**

 ***or***

 **After the 45th monthly payment, the outstanding car loan amount is**

7. Let and . Find the following. State any restrictions for , when

 applicable.

 a. b. c.

 d. e. f.

 **a. ( )() )**

 **b. ( • )() )**

 **c. ,**

 **Note: If , then , and we know division by zero is undefined.**

 **d. and**

 **Therefore, ( )()**

 **Note: Another option is to first find , then evaluate the resulting function at .**

 **e. . This means function will be the input for function .**

 **) = = =**

 **f. To find , first evaluate the *inside* function "" when :**

 **= 17**

 **Now substitute the resulting value, 17, into "" and evaluate:**

 **Note: Another option is to first find the composite function, then evaluate the**

 **resulting function at .**

8. Let and . Find the following.

 a. b.

 **a.**

 **b.**

9. Use the graph below to evaluate (◦ ).



 **First, find from the graph:**

 **Now, evaluate function "" at , that is, find from the graph:**

 **Therefore, (◦ ).**

10. Determine if and are inverses of each other.

**The functions are inverses of each other if and only if and .**

 **(**◦ **)**

 **and**

 **(**◦ **)**

 **Therefore, the given functions are inverses of each other.**