

UNIT 1 REVIEW - The following topics will be included on Unit 1 Test:

Lesson 1: Functions

- Know and understand what the differences are between relations and functions.
- Know and understand what domain and range are with respect to graphs and equations of functions.
- Know how to use Set Builder and Interval notation.
- Know how to graph and evaluate a piecewise function.

Lesson 2: Analyzing Graphs of Functions and Relations

- Reflection symmetric – graph has an axis of symmetry
- Rotation symmetric – graph has a point about which it is symmetric.
- Even Function: $f(-x) = f(x)$ (symmetric to y-axis)
- Odd function: $f(-x) = -f(x)$ (symmetric to the origin)
- Be able to prove even or odd, or disprove with a counterexample.

Lesson 3a: Parent Functions

- Know the parent functions and their properties
- Asymptotes and points of discontinuity

Lesson 3b: Graph Translations

- Translation $T(x,y) \rightarrow (x+h, y+k)$ tells you where the function moves.
- Make a new equation: replace (x) with (x-h) and (y) with (y-k)
- Find asymptotes for translated graphs.

Lesson 3c: Graph Dilations/Scale Changes

- Multiply (x) values = horizontal scale change
- Multiply (y) values = vertical scale change
- Write a formula for the dilations/scale change $S:(x,y) \rightarrow (ax, by)$
- Write an equation for the scaled equation – take the original equation and replace (x) with $\frac{x}{a}$ and (y) with $\frac{y}{b}$.

Lesson 4: Composition of Functions

- Arithmetic operations of functions (add, subtract, multiply, and divide)
- Composing functions $f(g(x))$, notation $f \circ g$
- Find the domain of $f \circ g$
- Evaluate $f(g(x))$ and $g(f(x))$. Find a rule for $f(g(x))$ and $g(f(x))$
- Are there restrictions on the domain?

Lesson 5: Inverse Relations and Functions

- Find the inverse of a function (switch x and y's)
- Use the Vertical Line Test to determine if a graph function
- Use the Horizontal Line Test to determine if the inverse of a graph is a function.
- Two functions are inverses if $f(g(x)) = g(f(x)) = x$. Be able to prove that two functions are or are not inverses.
- Axis of symmetry between the function and its inverse is $y = x$.

Lesson 6: Step Functions

- Be able to identify step functions
- Be able to create an equation for a step function
- Be able to evaluate step functions
- Be able to graph a step function