**Colorado Technical University**

 **Course:** MATH116 – Foundations for Calculus

**Unit 1 Part 2 Readings: Functions**

**Functions**

A function can have **only one y per x**

Use a **vertical line to test** whether a graph is a function (the **VLT**)

 A function can have more than one *x*-intercept but not more than one *y*-intercept

 When you evaluate a function, you need to substitute the given value for *x* in the

equation

**Relation** - any set of ordered pairs

 Ordered pairs {(*x*1,*y*1)...(*x*n,*y*n)}

braces indicate a set

 **Domain** - the *x*s

 **Range** - the *y*s

 functions are usually given as equations rather than sets

 *x* is the independent variable - it can take on any value in the domain

 *y* is the dependent variable - it's value depends on the value of *x*

**Subscript notation**

 *x*1, *x*2, *x*3, … *x*n

 *y*1, *y*2, *y*3, … *y*n

**Function notation**

 *y* = ƒ(*x*)

 **evaluating a function:** ƒ(2) is the same as saying the value of *y* where *x* = 2

 substitute whatever is in the parentheses for the "*x*" in the function

**Graphs of functions**

 graphing a function - graph the ordered pairs

piecewise, increasing, decreasing, constant, even, odd, step

 The graph of an **even function** is symmetric with respect to the *y*-axis

 The graph of an **odd function** is symmetric with respect to the origin

 graphing traditions:

○ an open dot in or at the end of a line means the point is not included

● a closed dot at the end of a line means it is included but the graph ends at that

 point

→ an arrow at the end of a line indicates the graph goes on indefinitely

**Types of Functions:**

piecewise functions - defined by two or more equations over the domain

increasing & decreasing functions & constants

relative maximums & minimums

even functions are symmetric with respect to the *y*-axis ƒ(*x*) = ƒ(–*x*)

odd functions are symmetric with respect to the origin ƒ(–*x*) = – ƒ(*x*)

step functions function values graphically form discontinuous steps

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