**Colorado Technical University**

**Course:** MATH116 – Foundations for Calculus

**Unit 2 Part 03 Readings: Lines and Quadratics (Parabolas)**

**Lines**

**What defines a line?**

To define a unique line, you need:

two points or a point and a slope

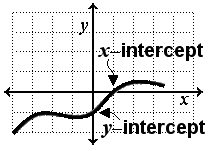
**Slope of a line**

rise y1 y2

.

run x1 x2

m = =



**Intercepts**

the x-intercept is the x value where y = 0

the y-intercept is the y value where x = 0

***y*-intercept**

b = y – mx

**Equations of a line**

Point-slope form: y – y 1 = m(x – x1) where (x1, x1) is a given point

Slope-intercept form: y= mx+ b

**Vertical line**

x = a, where a is the x-intercept

(slope is undefined)

**Horizontal line**

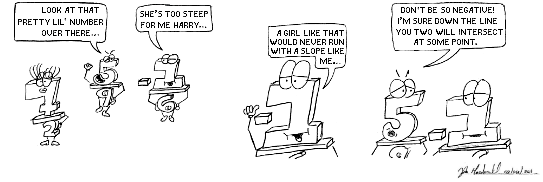
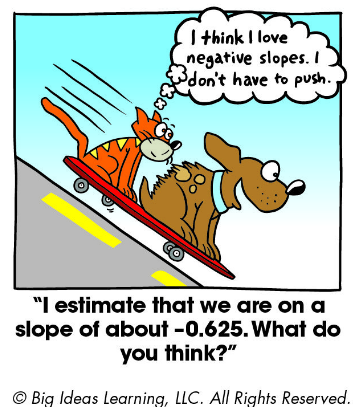
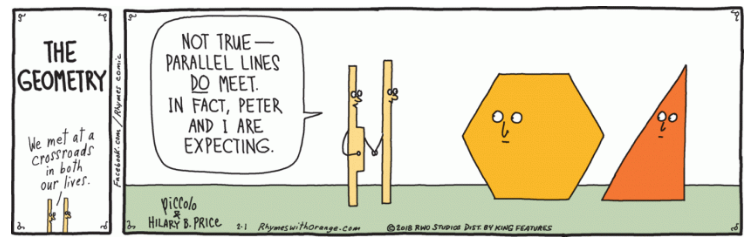
y = b, where b is the y-intercept

**Parallel Lines**

have the same slope

**Perpendicular lines**

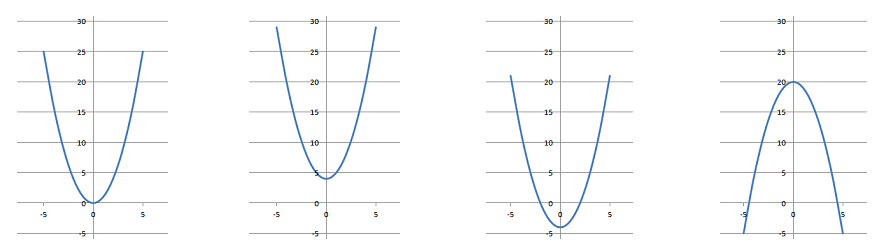
the product of their slopes is –1



**Parabolas and Quadratic Equations**

**Parabolas:**

*y* = *x*2 *y* = *x*2 + 4 *y* = *x*2  4 *y* = (*x*2) + 20

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In general, the equation for a parabola is: *ax*2 + *bx* + *c* = *y*

**Shapes of the curve:**

The constant at the end moves the curve vertically up or down

A coefficient (greater than one) for the x2 term makes the curve skinnier

A negative coefficient for the x2 term makes it a "hill" rather than a "cup"

A positive coefficient for the "x" term moves it both vertically and horizontally

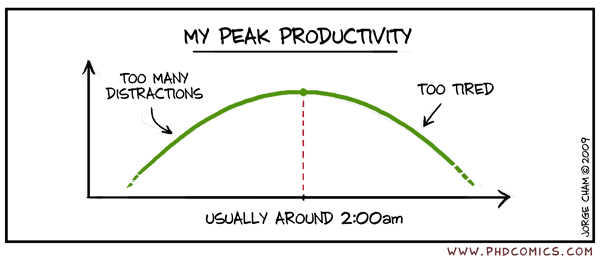
A negative coefficient for the "x" term moves it up and to the left

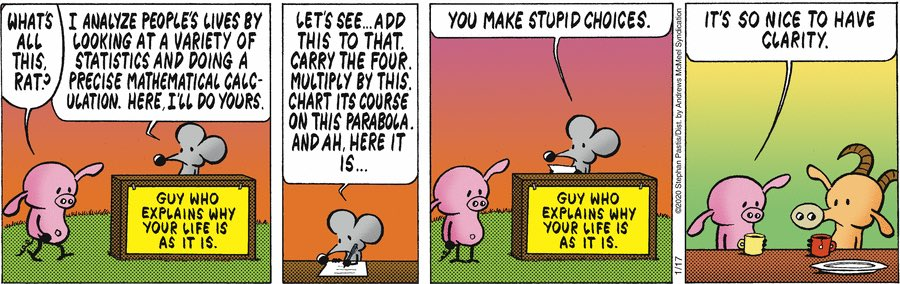
**Quadratic formulas**

Equations of parabolas are called "quadratic"

An equation in which one or more of the terms is squared but raised to no higher power

The "quad" is because they are "squared"

**** Quadratic formulas are of the form: *ax*2 + *bx* = *c*

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