What is the difference between each of the ski slopes below ?
(Each drops 100 vertical feet)

Widow Maker

Fun In The Sun

Bunny Delight

Slope is the ratio of vertical change over horizontal change.

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{where } x_1 \neq x_2$$

Ex 1) Find the slope of the line containing the points (-1, 5) and (3, -7).

1 2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7 - 5}{3 + 1}$$

$$= \frac{-12}{4}$$

$$= -3$$

Theorem

The slope of the line $Ax + By = C$ is $\frac{-A}{B}$ $(B \neq 0)$

Ex 2) Find the slope of the line $3x - 4y = 20$

$A = 3 \quad B = -4$

$$-\frac{A}{B} = \frac{-3}{-4}$$

$$= \frac{3}{4}$$

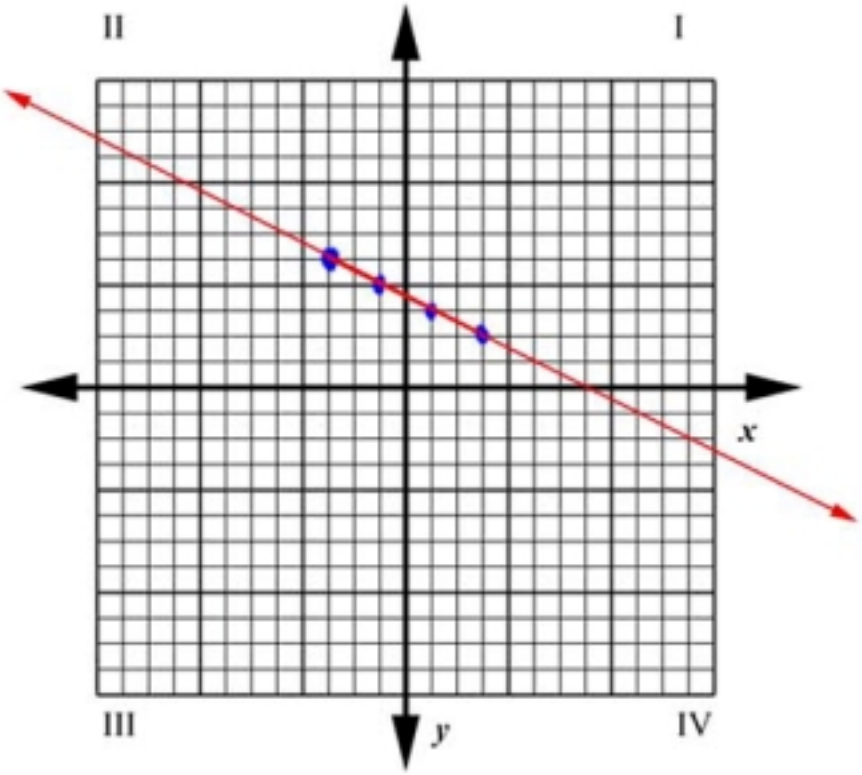
The slope of a horizontal line ($By = C$) is zero (0)
The slope of a vertical line ($Ax = C$) is "no slope" or "undefined".

Mr. Clausen prefers the term "undefined" for vertical lines since the definition of a rational number is not defined when 0 (zero) is in the denominator.

Think of skiing... on a horizontal line you will travel 0 (zero) distance, so the slope is 0 (zero).

"Clausen-ism" Alert!
When you ski a vertical line your body parts are hard to find, therefore, the slope is undefined.

Ex 3) Graph the line through the point (-3, 5) having a slope of m= -½.



Slope Intercept Form of an Equation:

$y = mx + b$

m is the slope, b is the y-intercept.

Ex 4) Graph $3x + 4y = 12$

$-3x \qquad -3x$

$\frac{4y}{4} = \frac{-3x + 12}{4}$

$y = -\frac{3}{4}x + 3$

$b = 3, \quad m = -\frac{3}{4}$