

change x

x	y
0	5
1	10
2	15
3	20
4	25
5	30

change y

# Rule

## How to Create a Linear Algebraic Expression

A linear algebraic will usually take this form:

$$y = mx + b$$

In this equation:

$$\underset{\substack{\uparrow \\ \text{multiplier}}}{5}x + \underline{5} = y$$

**y = The Pattern Total.** This is the number that you're trying to find. It will appear on the right hand side of your table of values and on the y-axis of your graph.

**m = The Multiplier.** This is the number that you need to multiply. You find it by using the Change in Y divided by the change in X. It can also be found on the graph.

**x = The Term Number.** This the number that keeps the order of the pattern. It will appear on the left side of your table of values and on the x-axis of your graph.

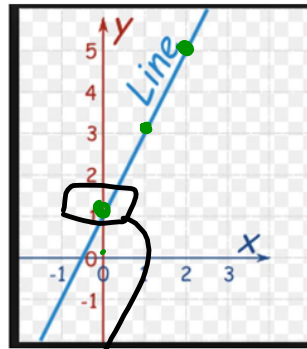
**b = The Base.** This is the number that never changes. The pattern either starts here or has this added on or subtracted from. You can find it by looking at the location that your line crosses the y-axis or using your table of values when the X = 0

Highlight each part of the equation, the create the equation:

Change x

x	y
0	1
1	3
2	5
3	7
10	

change y



$$m = \frac{\text{change } y}{\text{change } x}$$

$$= \frac{2}{1}$$

$$= 2$$

$$mx + b = y$$

$$\underline{2}x + \underline{1} = y$$

\*most efficient way to find y value when  $x = 10$  is substitute it into your equation

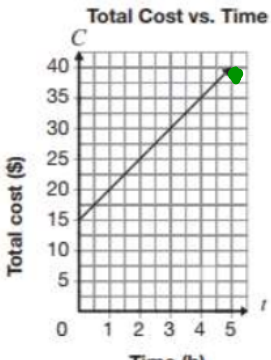
$$2x + 1 = y$$

$$2(10) + 1 = y$$

$$\boxed{21 = y}$$

**Ski Day**

Information about the linear relationship between the total cost of skiing,  $C$ , in dollars, and time,  $t$ , in hours, at three different ski resorts is shown below.

Ski Slope Hill	Mountain Ski	Snow Way Adventures														
<table border="1" style="margin: auto;"> <thead> <tr> <th style="text-align: center;"><math>x</math></th> <th style="text-align: center;"><math>y</math></th> </tr> <tr> <th style="text-align: center;">Time, <math>t</math> (h)</th> <th style="text-align: center;">Total cost, <math>C</math> (\$)</th> </tr> </thead> <tr><td style="text-align: center;">1</td><td style="text-align: center;">10</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">20</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">30</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">40</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">50</td></tr> </table>	$x$	$y$	Time, $t$ (h)	Total cost, $C$ (\$)	1	10	2	20	3	30	4	40	5	50	$C = 8t$ $y = 8x$	
$x$	$y$															
Time, $t$ (h)	Total cost, $C$ (\$)															
1	10															
2	20															
3	30															
4	40															
5	50															

**Rule**

1. Determine the algebraic equation for Ski Slope Hill and Snow way Adventures in the box above

$C = 10t$   
 $10x = y$

$y = 10x$   
\$10 per hour

$y = 8x$

$5x + 15 = y$   
\$5 per hour

Entrance fee

2. Assuming all three hills are great, which would you choose to ski at based on the price. Defend your point.

∴ 12 hrs     $10(12) = 8(12)$

\$120    vs = 96    vs  $5x + 15$

$5(12) + 15$

\$75

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> 5

cheapest option if under 5 hours

$8(5)$   
= 40

$5(5) + 15$   
= 40