Linear Relationships: Proportional vs. Non-Proportional

Verbal Examples

Proportional: Mr. Mangham started the year with \$0. Each week he earned \$25.

Non-Proportional: Mr. Mangham started the year with \$75. Each week he earned \$25.

How to tell the difference:
A proportional situation always starts at zero (in this case \$0 at the first of the year). A non-proportional situation does not start at zero (in this case \$75 at the first of the year).

Table Examples

Proportional:

Weeks	0	1	2	3	4
Money (\$)	0	25	50	75	100
$\frac{\text{Money}}{\text{Weeks}}$	---	25	25	25	25

Non-Proportional:

Weeks	0	1	2	3	4
Money (\$)	75	100	125	150	175
$\frac{\text{Money}}{\text{Weeks}}$	---	100	62.5	50	43.75

How to tell the difference:
A proportional table has a constant of proportionality in that y divided by x always equals the same value. A non-proportional table will have different values when y is divided by x.

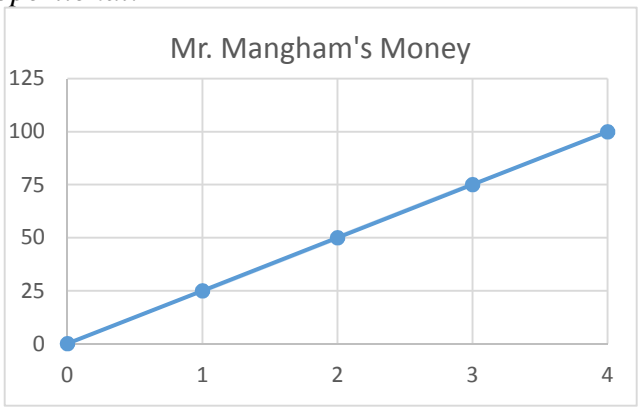
Equation Examples

Proportional: $y = 25x$ *Non-proportional:* $y = 25x + 75$

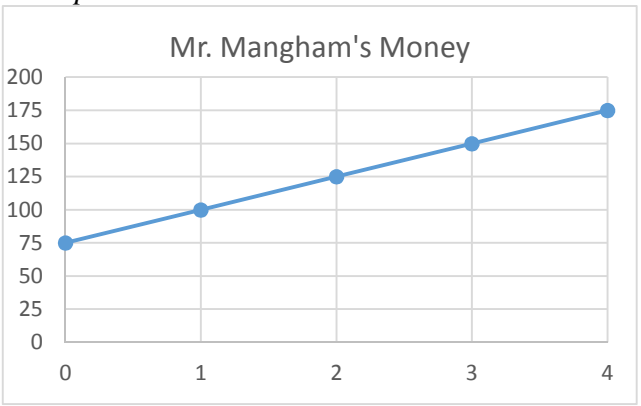
How to tell the difference:
A proportional equation is always in the form $y = kx$, where k is the unit rate or constant of proportionality. A non-proportional equation is always in the form $y = mx + b$, where m is the constant rate of change or slope. The key difference is the added b on the end.

Graph Examples

Proportional:



Non-Proportional:



How to tell the difference:
A proportional graph is a straight line that always goes through the origin.
A non-proportional graph is a straight line that does not go through the origin.