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Direct Variation

Direct variation is a special case of a linear relationship... it must contain the point (0,0). It passes through the origin; therefore it has a y-intercept of 0.

So, it is in the form: $y = a \cdot x$ or $\frac{y}{x} = a$

a = constant of variation ... think "slope"

If we were to say, "y varies directly with x, and the constant of variation is 3, that means:

$y = 3x$ or $\frac{y}{x} = 3$

Another way to think about it.... $\frac{y}{x}$ is always the same number.

(This number is the constant of variation.)

Yet another way to think of it:

If y varies directly with x, then

when x increases, y also increases;
when x decreases, y also decreases.

In the Function Family Album:

Function Family Name: **Direct Variation**

General Equation in Standard Form:

$y = ax$

Variable Meanings:

a = constant of variation (slope)

General Graph Shape:

When a > 0: Linear increase

When a < 0: Linear decrease

General Table Characteristics:

Constant 1st difference:

x	0	1	2	3
y	1	3	5	7
		+2	+2	+2

Domain & Range:

Domain: All Real

Range: All Real

* May be restricted by context.

Asymptotes:

None

Example:

The total cost (y) of Little Caesar's pizza varied directly with the number of pizzas purchased. The constant of variation is 5.

$y = 5x$

* Domain: 0,1,2,3,...

Range: 0,5,10,15...