

Proportionalities



A linear graph with a y-intercept of zero....

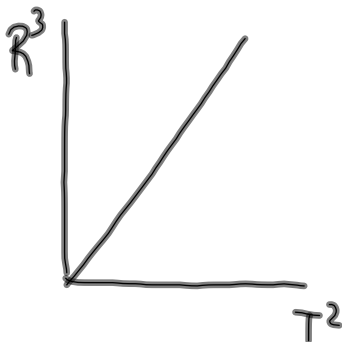
- "y varies directly with x"
- "y is directly proportional to x"

$$y \propto x$$

this is
just a
linear
equation

$$\rightarrow y = kx \quad (k \text{ is the proportionality constant})$$

$$(y = mx + b)$$



A linear graph: R^3 vs T^2

R^3 is directly proportional to T^2

$$R^3 \propto T^2$$

$$R^3 = kT^2$$

Practice:

1. a) $z \propto t^3$

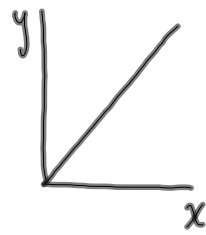
b) $P \propto w^2$

c) $A \propto m$

d) $V \propto r^3$

e) $S \propto r$

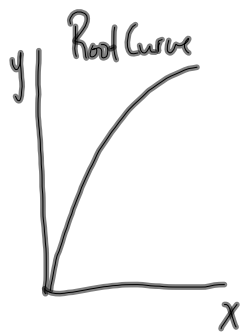
Graphical Analysis of Data



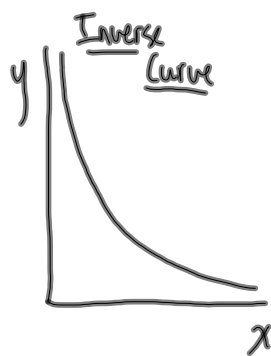
$y \propto x$ (proportionality statement)
 $y = kx$ (general equation)
 $(y = mx + b)$ ← just a linear equation
 slope is k , b is zero



$y \propto x^n$
 $y = kx^n$
 $(y = mx + b)$
 A plot of y vs x^n will be linear with a slope of k and a y-intercept of zero.



$y \propto \sqrt[n]{x}$
 $y = k\sqrt[n]{x}$
 $(y = mx + b)$
 A plot of y vs $\sqrt[n]{x}$ will be linear with a slope of k and a y-intercept of zero



$y \propto \frac{1}{x^n}$
 $y = k\left(\frac{1}{x^n}\right)$
 $(y = mx + b)$
 A plot of y vs $\frac{1}{x^n}$ will be linear with a slope of k and a y-intercept of zero.