Proportionalities

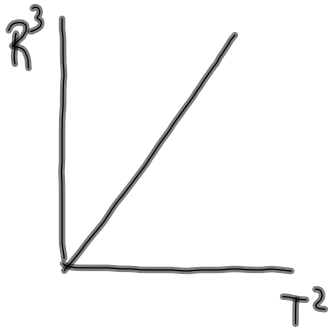
A linear graph with a y-intercept of zero....

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

$y \propto x$

this is just a linear equation → $y = kx$ (k 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) $z \propto t^3$

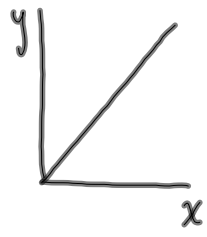
b) $P \propto w^2$

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

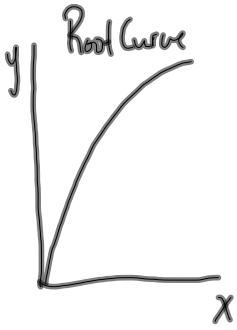
slope is k, b is zero

$y \propto x^n$

$y = kx^n$

$(y = mx + b)$

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.