

Analyzing Experimental Data - Proportioning Techniques

time (s)	1	2	3	4	5	6	7
distance (m)	28	56	84	112	140	168	196

Diagram showing multipliers between columns: 1 to 2 (x2), 1 to 3 (x3), 1 to 7 (x7), 2 to 3 (x1.5), 2 to 7 (x3.5), 3 to 7 (x2.33).

When the multipliers are equal then we know that there is a direct proportionality between the two variables.

$$d \propto t$$

proportionality

$$d = kt$$

general equation

$$k = \frac{d}{t}$$

$$k = \frac{112 \text{ m}}{4 \text{ s}}$$

$$k = 28 \text{ m/s}$$

solve for k

$$d = (28 \text{ m/s})t$$

specific equation

frequency (Hz)	5	10	20	50	75	100
period (s)	0.2	0.1	0.05	0.02	0.013	0.01

Diagram showing multipliers between columns: 5 to 10 (x2), 5 to 20 (x4), 5 to 50 (x10), 5 to 100 (x20), 10 to 20 (x2), 10 to 50 (x5), 10 to 100 (x10), 20 to 50 (x2.5), 20 to 100 (x5), 50 to 100 (x2), 0.2 to 0.1 (x 1/2), 0.2 to 0.05 (x 1/4), 0.2 to 0.02 (x 1/10), 0.2 to 0.01 (x 1/20), 0.1 to 0.05 (x 1/2), 0.1 to 0.02 (x 1/5), 0.1 to 0.01 (x 1/10), 0.05 to 0.02 (x 1/2.5), 0.05 to 0.01 (x 1/5), 0.02 to 0.01 (x 1/2).

$$T \propto \frac{1}{f}$$

SP1

y	x
250	3
750	9
2500	30
5000	60

$$x \propto y$$

SP2

A	B
20	14
80	28
180	42
2000	140

$$A \propto B^2$$

$$B^2 \propto A$$

$$\sqrt{A} \propto B$$

SP3

F	r
900	1
225	2
36	5
14	18
1	30

$$F \propto \frac{1}{r^2}$$

$$r^2 \propto \frac{1}{F}$$

$$\sqrt{F} \propto \frac{1}{r}$$

TO DO

① FOP / PP/23

② FOP / p38 / 26 + 27

③ Assignment (FOP) - due Fri

p38 / 28 - 34, 35 + 36
ADV

- } for all sets of data
- ① proportionality
 - ② gen. eq.
 - ③ find k
 - ④ specific eq.