Analyzing Experimental Data - Proportioning Techniques

×2 ×4 ×3

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

×2 ×4 ×3

Since the multipliers for time are equal to the multipliers for distance, we can say that there is a direct relationship between distance and time

(proportionality statement) $d \propto t$

"d varies directly with t"

"d is directly proportional to t"

(general equation) $d = kt$

$$84\,\text{m} = k(3\,\text{s})$$

$$k = \frac{84\,\text{m}}{3\,\text{s}}$$

(Proportionality constant) $k = 28\,\frac{\text{m}}{\text{s}}$

(specific equation) $d = \left(28\,\frac{\text{m}}{\text{s}}\right)t$

$\times 2$ $\times 5$ $\times 10$

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

$\times \frac{1}{2}$ $\times \frac{1}{5}$ $\times \frac{1}{10}$

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

Sample Problems (FoP/p22)

1.

	y	x	
	250	3	
$\times 3$	750	9	$\times 3$
$\times 10$	2500	30	$\times 10$
$\times 2$	5000	60	$\times 2$

$y \propto x$

2.

	A	B	
	20	14	
$\times 4$	80	28	$\times 2$
$\times 9$	180	42	$\times 3$
$\times 100$	2000	140	$\times 10$

square these multipliers

$A \propto B^2$

3.

	F	r	
	900	1	
$\times \frac{1}{4}$	225	2	$\times 2$
$\times \frac{1}{25}$	36	5	$\times 5$
	14	18	
$\times \frac{1}{900}$	1	30	$\times 30$

need to match the denominator of the multipliers of F

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

TO DO: (in FoP booklet)

① Practice/p23
- find the prop
- write the general eq.
- find k
- write specific eq.

② p38/26, 27 (same as above)