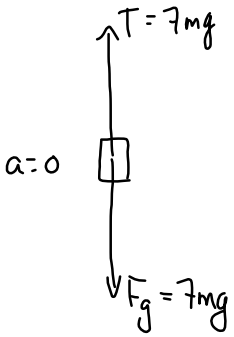
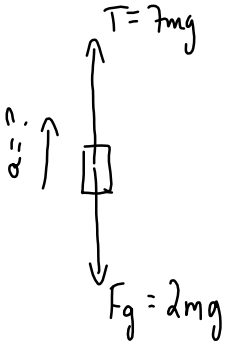
Review

26.





let m be mass of Cheetah
2m be James mass
4m be Tarzan's mass
7m

$\vec{F}_{net} = m\vec{a}$

$T - F_g = ma$ (2m)

$7mg - 2mg = 2ma$

$5mg = 2ma$

$a = \frac{5}{2}g$

$V_1 = 0$

$a = \frac{5}{2}g$

$\Delta d = 60\,m$

$\Delta t = ?$

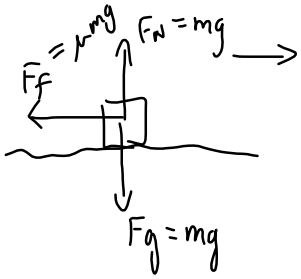
$\Delta d = \cancel{V_1 t}^{0} + \frac{1}{2}at^2$

30. $V_1 = 2.0\,m/s$

$V_2 = 0$

$\mu = 0.20$

$\Delta d = ?$



$\vec{F}_{net} = m\vec{a}$

$-F_f = ma$

$-\mu mg = ma$

$a = -\mu g$

$a = -(0.20)(9.81\,m/s^2)$

$a = -1.96\,m/s^2$

$V_1 = 2.0\,m/s$

$V_2 = 0$

$a = -1.96\,m/s^2$

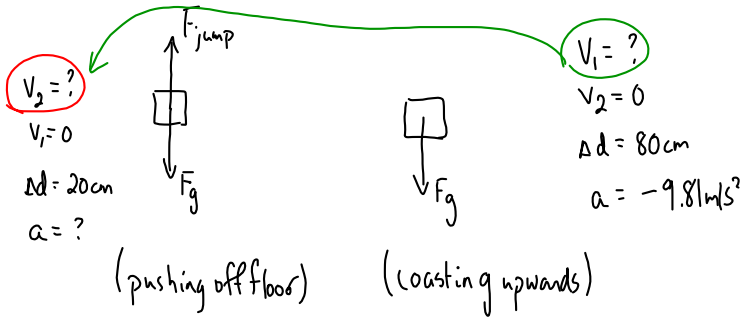
$\Delta d = ??$

$V_2^2 = V_1^2 + 2a\Delta d$

$V_2^2 - V_1^2 = 2a\Delta d$

$\Delta d = \frac{V_2^2 - V_1^2}{2a}$

22. Draw 2 freebody diagrams:



$V_2^2 = V_1^2 + 2a\Delta d$

$\frac{V_2^2 - V_1^2}{2\Delta d} = a$

$a = \frac{(39.618 m/s)^2 - 0^2}{2(0.20m)}$

$a = 39.24 m/s^2$

$V_2^2 = V_1^2 + 2a\Delta d$

$V_1^2 = \cancel{V_2^2}^{0} - 2a\Delta d$

$V_1^2 = -2(-9.81 m/s^2)(0.80m)$

$V_1 = 3.9618.... m/s$

$\vec{F_{net}} = m\vec{a}$

$F_{jump} - F_g = ma$

$F_{jump} = ma + mg$

$F_{jump} = m(a+g)$

$F_{jump} = 70.0kg(39.24 m/s^2 + 9.81 m/s^2)$

$F_{jump} = 3.4 \times 10^3 N$

17. $m = 6.0kg$
$F_a = 36N$
$V_1 = V_0$
$V_2 = 2V_0$
$\Delta d = 10m$

$a = \frac{36N}{6.0kg} = 6.0 m/s^2$

a) $V_1 = ?$
b) $\Delta t = ?$

$V_2^2 = V_1^2 + 2a\Delta d$

$(2V_0)^2 = V_0^2 + 2(6.0 m/s^2)(10m)$

$4V_0^2 = V_0^2 + 120 m^2/s^2$

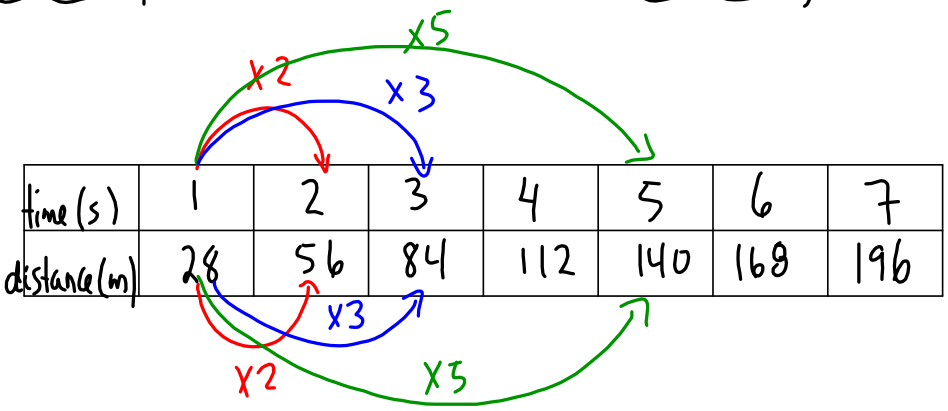
$3V_0^2 = 120 m^2/s^2$

$V_0^2 = 40 m^2/s^2$

$V_0 = 6.3 m/s$

b) $a = \frac{\Delta V}{\Delta t}$

Analyzing Experimental Data - Proportioning Techniques



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

If the factors (or multipliers) match then we have a direct proportionality.

$d \propto t$ (proportionality statement)

$d = kt$ (general equation)

solve for k: $k = \frac{d}{t}$

$k = \frac{28m}{1s}$ (find k)

$k = 28 m/s$

$d = (28 m/s)t$ (specific equation)

$(y = mx + b)$

If you plotted d vs t, the graph would be linear with a slope of (28 m/s) and y-intercept of zero.

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

x2, x5, x10, $\times\frac{1}{2}$, $\times\frac{1}{5}$, $\times\frac{1}{10}$

The period is inversely proportional to the frequency.

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

$T = k\left(\frac{1}{f}\right)$

$T = \frac{k}{f}$

$\vdots$ etc.

Sample Problems

1. $y \propto x$

y	x
250	3
750	9
2500	30
5000	60

x3, x10, x20, x3, x10, x20

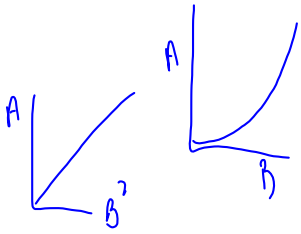
2.

A	B
20	14
80	28
180	42
2000	140

x4, x9, x100, x2, x3, x10

$A \propto B^2$

$3^? = 9$



3.

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

$\times\frac{1}{4}$, $\times\frac{1}{25}$, $\times\frac{1}{900}$, x2, x5, x30

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

TO DO: 1. PP 123 (FOP)
2. p39 | 26 + 27

① find proportionality
② general eq.
③ find k.
④ write specific eq.