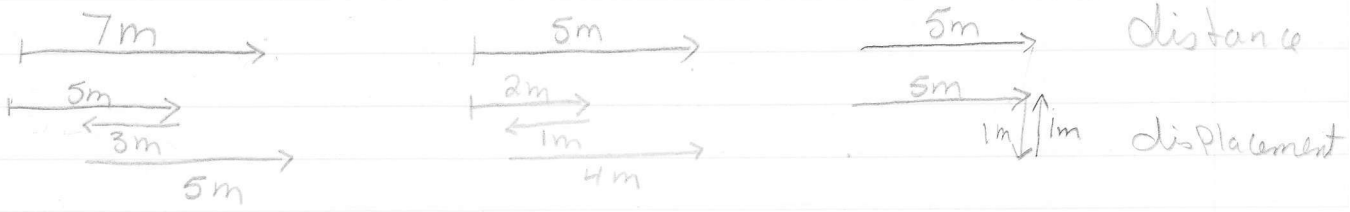
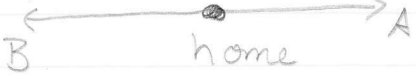
Ans Review unit 1

1- Scalar: distance, Speed, time
Vector: displacement, velocity, acceleration

2. 

3. 4m [E] / 4m [W] A vector quantity refers to size and direction. 4m[E] & 4m[W] both have the same size but they are not equivalent because they bring us to different places.



4- a) $20\,min \left| \frac{60\,s}{1\,min} \right. = 1200\,s$

b) $6.5\,h \left| \frac{60\,min}{1\,h} \right. = 390\,min$

c) $0.6\,day \left| \frac{24\,h}{1\,day} \right. = 14.4\,h$

d) $4.5\,yr \left| \frac{365\,days}{1\,yr} \right| \frac{24\,h}{1\,day} \left| \frac{3600\,s}{1\,h} \right. =$

$141\,912\,000\,s = 1.4 \times 10^{8}\,s$

e) $453\,s \left| \frac{1\,h}{3600\,s} \right. = 0.126\,h =$

f) $0.35\,min \left| \frac{1\,h}{60\,min} \right| \frac{1\,day}{24\,h} \left| \frac{1\,yr}{365\,day} \right.$

$6.659 \times 10^{-7}\,yr$

$6.7 \times 10^{-7}\,yr$

5 a) $\frac{25\,Km}{1\,hr} \left| \frac{1000\,m}{1\,Km} \right| \frac{1\,hr}{3600\,s}$

$= 6.94\,m/s \quad = 6.9\,m/s$

b) $\frac{150\,Km}{1\,hr} \left| \frac{1000\,m}{1\,Km} \right| \frac{1\,hr}{3600\,s}$

$= 41.7\,m/s$

$42\,m/s$

c) $\frac{2.0\,m}{1\,s} \left| \frac{1\,Km}{1000\,m} \right| \frac{3600\,s}{1\,h}$

$= 7.2\,Km/h$

D) $\frac{50\,m}{s} \left| \frac{1\,km}{1000\,m} \right| \frac{3600\,s}{1\,h}$

$= 180\,km/h$

$= 200\,Km/h$

6- $\frac{14.7\,m}{s} \left| \frac{1\,km}{1000\,m} \right| \frac{3600\,s}{1\,h} = 52.92\,km/h = 52.9\,km/h$
Yes he would get a ticket

7- $d_1 = 100m$ $t_1 = 9.84s$ $v = \frac{d}{t} = \frac{100}{9.84} = 10.16\,m/s$ $10\,m/s$

$d_2 = 200m$ $t_2 = 19.32s$ $v = \frac{d}{t} = \frac{200}{19.32} = 10.35\,m/s$ $10\,m/s$

$d_3 = 400m$ $t = 43.39s$ $v = \frac{d}{t} = \frac{400}{43.39} = 9.22\,m/s$ $9\,m/s$

8- $t = 45s = 0.0125$ $v = 140\,km/h$ $d = vt = (140)(0.0125) = 1.75\,km = 1.8\,km$

9- $t = 0.5s$ $v = 30\,km/h = 8.33\,m/s$ $d = ?$ $d = vt = (8.33)(0.5) = 4.17\,m$ $d = 4m$

10- $v_L = 3.0 \times 10^8\,m/s$ $v_s = 344\,m/s$ $d = 1.0 \times 10^4\,m$

$t_s = \frac{d}{v} = \frac{1.0 \times 10^4}{344} = 29.5$

$t_L = \frac{d}{v} = \frac{1.0 \times 10^4}{3.0 \times 10^8} = 3.3 \times 10^{-5}\,s$

11. $v_i = 0$ $v_F = 10.2\,m/s$ $t = 2.5\,s$ $a = \frac{v_F - v_i}{t} = \frac{10.2 - 0}{2.5} = 4.1\,m/s^2$

12- $a = 2.2\,m/s^2$ $t = 2.5\,s$ $v_F = ?$ $v_i = 0$

$at = v_F - v_i$

$v_F = at + v_i$

$v_F = (2.2)(2.5) + 0$

$v_F = 5.5\,m/s$

13. $t = 0.08s$
$v_i = 13.0 m/s$
$v_F = 0$
$a = ?$

$$a = \frac{v_F - v_i}{t} = \frac{0 - 13}{0.08} = -162.5 m/s^2 \quad -200 m/s^2$$

14. $v_i = 0$
$v_F = 100 km/h = 27.8 m/s$
$t = 1.5s$

$$a = \frac{v_F - v_i}{t} = \frac{27.8 - 0}{1.5} = 18.5 m/s^2 \quad 20 m/s^2$$

15- $r = 75.0\,m$ $\quad C = 2\pi r$ $\quad C \times 2 = 942.48\,m$

$t_1 = 33.5\,s$ $\quad C = 2\pi(75)$

$t_2 = 27.6\,s$ $\quad C = 471.23\,m$

a) $V_{avg} = \frac{d_t}{t_t}$ $\quad d_t = 942.48$

$t_t = 33.5 + 27.6 = 61.1\,s$

$V_{avg} = \frac{942.48}{61.1} = \boxed{15.4\ m/s}$

b) No displacement $\therefore$ No velocity.

16- $d_1 = 5.7\,km$ E $\quad V_{avg} = \frac{d_t}{t_t}$ $\quad d_t = 5.7 + 1.0 + 12.5 = 19.2$

$t_1 = 2.75\,h$ $\quad t_t = 2.75 + 0.5 + 2.5$

$d_2 = 1.0\,km$ W $\quad 5.75$

$t_2 = 0.50\,h$ $\quad V_{avg} = \frac{19.2}{5.75} = \boxed{3.3\ km/h}$

$d_3 = 12.5\,km$ E

$t_3 = 2.5\,h$

b) $\vec{V}_{avg} = \frac{\vec{d}_t}{t_t}$ $\quad \vec{d}_t = 5.7 - 1.0 + 12.5$

$= 17.2$

$\frac{17.2}{5.75} = \boxed{3.0\ km/h}$

17- $d_1 = 58\,km$ $\quad t = 5.0\,min = 0.0833$ $\quad t_3 = 0.5\,h$

$V_1 = 77\,km/h$ E $\quad d = 0\,km$ $\quad V_3 = 64\,km/h$

$d = vt$

$d = (64)(0.5)$

$= 32\,km$

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

$t = \frac{58}{77} = 0.753\,h$

$V_{avg} = \frac{\vec{d}_t}{t_t} = \frac{58 + 0 + 32}{0.753 + 0.0833 + 0.5} = \frac{90}{1.3363} = \boxed{67\ km/h\ E}$

18- Nick: $V = 5.0\ m/s$ E

Brendan: $V = 3.5\ m/s$ W

$d = 2.0\ km = 2000\ km$

$V_{NB} = V_N - V_B$

$= 5.0 - -3.5$

$= 8.5\ m/s$

$t = \frac{d}{V} = \frac{2000}{8.5} = 235\ s$

$\boxed{t = 240\ s}$

b) $d = Vt$

$= (3.5)(240)$

$\boxed{840\ m}$

19- Amanda: $V = 125\ km/h$

Erin: $V = 100\ km/h$

$d = 1.50\ km$

$V_{AE} = V_A - V_E$

$125 - 100$

$V_{AE} = 25\ km/h$

$t = \frac{d}{V} = \frac{1.5}{25} = \boxed{0.0600\ h}$

$= 3.60\ min$

b) $d = Vt$

$= (125)(0.0600)$

$= 7.5\ km$

20- Michael: $V = 107\ km/h$

Trevor: $V = 99\ km/h$

$d = 55\ km$

$V_{MT} = V_M - V_T$

$= 107 - (-99)$

$= 206\ km/h$

$t = \frac{d}{V} = \frac{55}{206} = 0.2669$

$= 0.27\ h$

$d = Vt$

$= (99)(0.27)$

$= 26.7\ km$

$\boxed{27\ km}$

They will meet 27 km from Complellton.

$t = 5.0 \text{ min} = 0.0833 \text{ h}$

20b) $d_T = Vt$
$= (99)(0.083)$
$= 8.25 \text{ km}$
$= 8.3 \text{ km}$

$\therefore d_{left} = d_{tot} - d_{Trav}$
$= 55 - 8.3$
$= 47 \text{ km}$

$V_{mT} = 206 \text{ km/h}$ $\quad d = 47 \text{ km}$

$$t = \frac{d}{V} = \frac{47}{206} = 0.23 \text{ h}$$

$d_M = Vt$
$= (107)(0.23)$
$= 24.61 \text{ km}$

25km

they will meet 25 km from Dalhousie

21- Jonah
$V = 3.0 \text{ m/s E}$
$t = 120 \text{ s}$

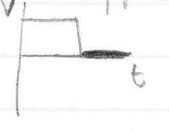
Eva
$V = 4.5 \text{ m/s E}$
$t = t - 2 = t - 120 \text{ s}$

$d_J = Vt$
$= (3.0)(120)$
360 m

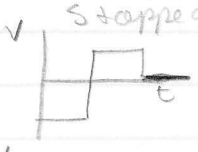
$V_{EJ} = V_E - V_J$
$= 4.5 - 3.0$
$= 1.5 \text{ m/s}$

$$t = \frac{d}{V} = \frac{360}{1.5} = 240 \text{ s}$$

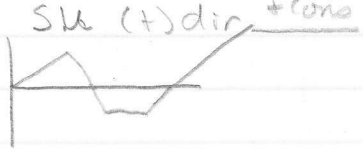
22- a) (+) cons. vel
Stopped



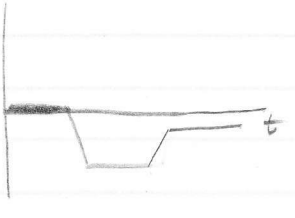
b) (-) Cons. Vel
(+) Cons. Vel
Stopped



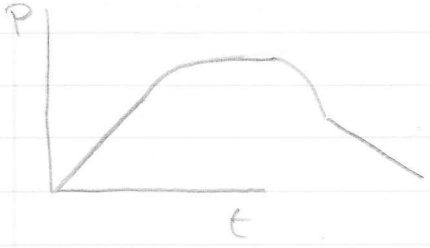
c) Su Pos. dir, Sd (+) dir.
(-) Cons. Vel, Sd (-) dir
Su (+) dir
+ Cons Vel



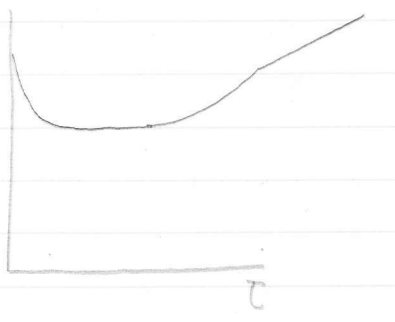
d) at rest, Su (-) dir
(-) Cons. Vel, Sd (-) dir
- Slow cons. Vel



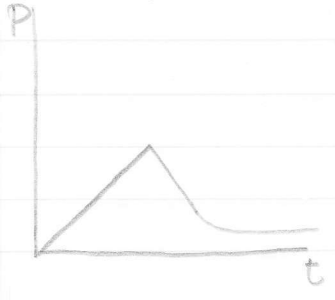
22e) (+) Cons. Vel, -acc, Stopped, -acc, -Cons. Vel.



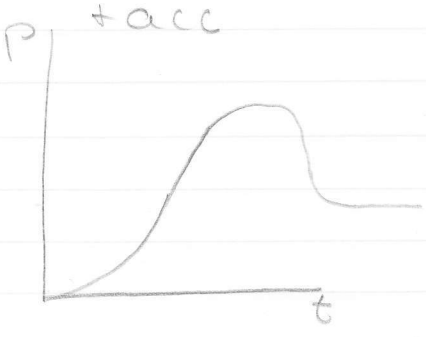
F) +acc, Stopped, +acc, +Cons. Vel



g) +Cons. Vel, -Cons. Vel. +acc, stopped



h) -acc, +Cons. Vel, -acc



23- $A = \frac{bh}{2}$ $\frac{(3)(3)}{2} = 4.5$ $A = bh = (3)(3) = 9$ $A = \frac{bh}{2}$ $\frac{3 \times 0.5}{2} = 1.25$

$4.5 + 9 + 1.25 - 0.5 - 4 =$ **10.25 units.**

$A = \frac{bh}{2}$ $\frac{(0.5)(2)}{2} = 0.5$ $A = bh = 2 \times 2 = 4$

b) $A = \frac{bh}{2}$ $\frac{(3)(3)}{2} = 4.5$ $A = bh$ $(3)(3)$ 9 $A = \frac{bh}{2}$ $\frac{(2)(3)}{2} = 3$

$4.5 + 9 + 3 =$ **16.5 units.**