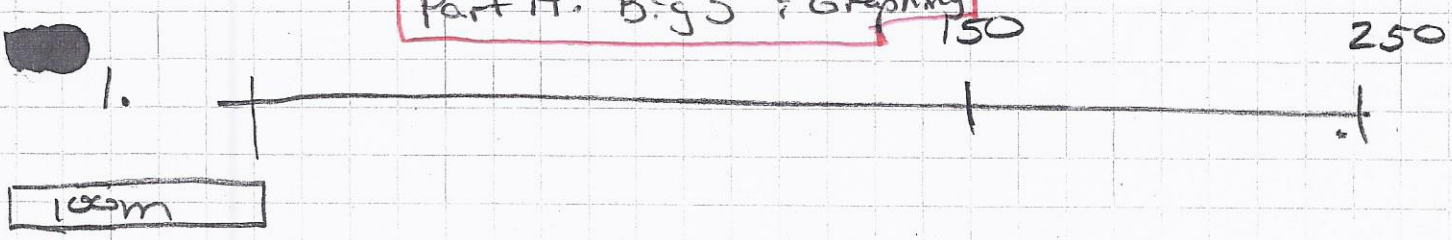
Review

Part A: Big 5 & Graphing

1.



Part 1 G: $V_1 = 0$, $\Delta d = 150m$, $V_2 = 25\ m/s$

R: a

S: $a = \frac{V_2^2}{2\Delta d} = 2.08\ m/s^2$

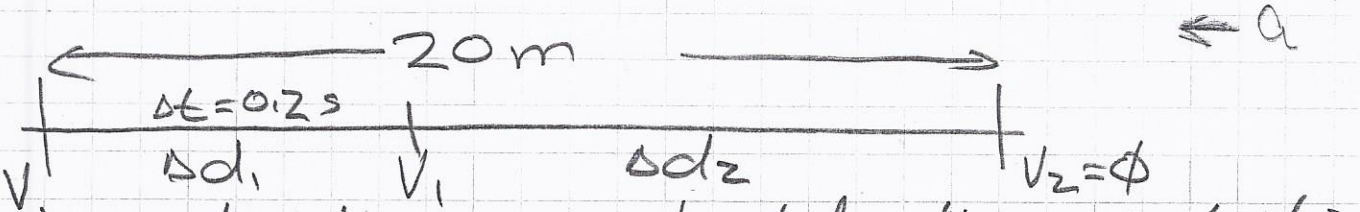
Part 2 G: $V_1 = 25\ m/s$, $\Delta d = 100m$, $a = 2.08\ m/s^2$

R: V_2

S: $V_2 = \sqrt{V_1^2 + 2a\Delta d}$

$= 32.3\ m/s.$

2.



$\Delta d_1 = V_1 \times 0.2$

$V_2^2 = V_1^2 + 2a\Delta d_2$

$\Delta d_2 = \frac{-V_1^2}{2a} = \frac{V_1^2}{12}$

$\Delta d_1 + \Delta d_2 = 20m$

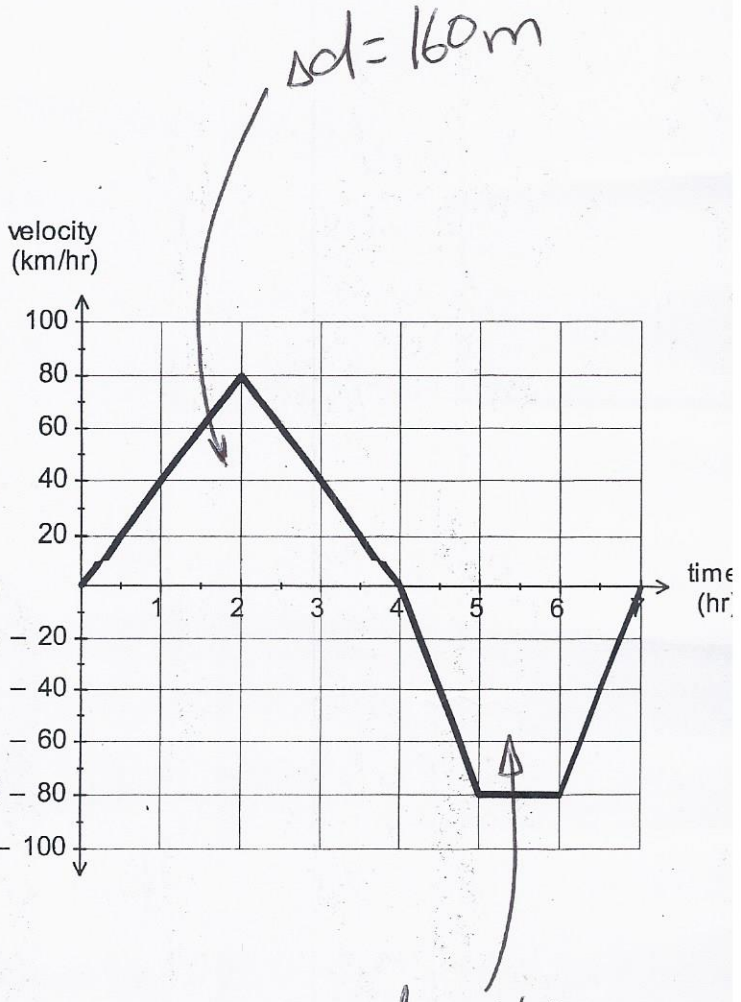
$0.2V_1 + \frac{V_1^2}{12} = 20$

$V_1^2 + 2.4V_1 - 240 = 0$

$V_1 = -1.2 \pm 15.54$

$V_1 = 14.34$

3. The graph to the right shows the velocity of a car driving along a straight road. Using this graph answer the following questions:



a. Total distance travelled in first 4 hours. 160m
b. Total distance travelled in final 3 hours. 160m
c. Total displacement. ϕ m
d. Acceleration during the time period 0-2 hours. 40
e. Acceleration during the time period 2-4 hours. -40
f. Acceleration during the time period 4-5 hours. -80
g. Acceleration during the time period 5-6 hours. 0
h. Acceleration during the time period 6-7 hours 80
i. Average speed for the entire trip. 45.7 km/hr
j. Average Velocity for the entire trip. ϕ

→ all answers in km/hr^2

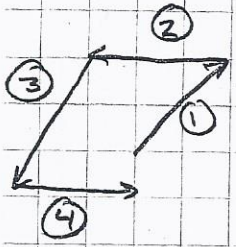
i $V = \frac{320km}{7hr}$

j $\vec{V} = \frac{\phi km}{7hr}$

PART B: VECTORS

1. a. speed = $\frac{\text{dist}}{\text{time}} = \frac{40.4\text{ km}}{(23/60)\text{ hrs}} = 105\text{ km/hr}$.

b. disp



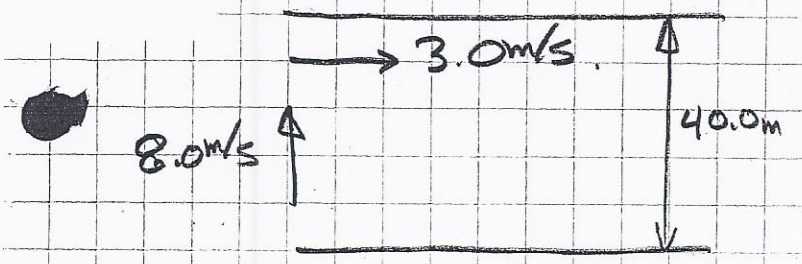
	(E-W) x	(N-S) y
①	7.07	7.07
②	-9.0	0
③	-8.06	-8.06
④	10	0
	0	-1.0

components of all 4 vectors

$= -1.0\text{ km [N]}$ or 1.0 km [S]

c. vel = $1.0\text{ km [S]} / (23/60)\text{ hr} = 2.6\text{ km/hr [S]}$.

2.



a. time to cross $= 40.0\text{ m} / 8.0\text{ m/s}$

$= 5\text{ s}$

b. disp $= 3.0\text{ m/s [E]} \times 5\text{ s}$

$= 15\text{ m [E]}$

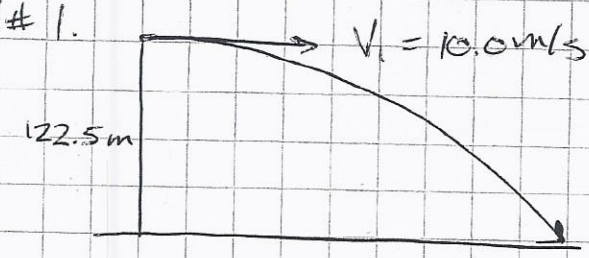
c. $V_{BS} = V_{BW} + V_{WS}$

$= 8.0\text{ m/s [N]} + 3.0\text{ m/s [E]}$

$= 8.5\text{ m/s [N21°E]}$

Revised - Answers PART C : Projectiles

#1.



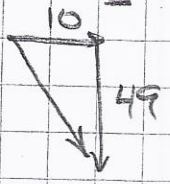
$\Delta d = V_i t + \frac{1}{2} a t^2$

a. $t = \sqrt{2d/a} = 5\ s$

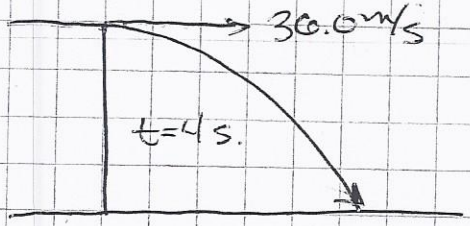
b. $\Delta d_H = V_H t = 50\ m$

c. $V_2 = \sqrt{2ad} = 49\ m/s\ [down]$

d. $50\ m/s\ [78°BH]$



#2.

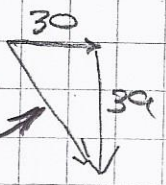


a. $\Delta d = \cancel{V_i t} + \frac{1}{2} a t^2 = 78\ m$

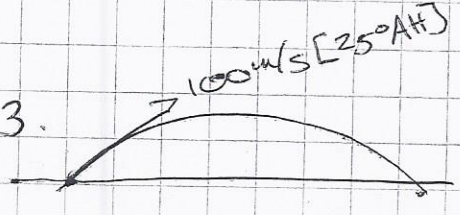
b. $V_{2V} = \sqrt{2ad} = 39\ m$

$V_f = 49\ m/s$

$(\sqrt{30^2 + 39^2})$

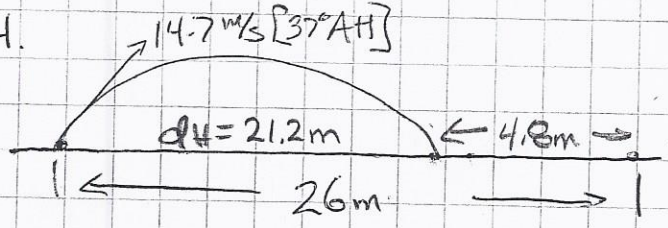


#3.



$d_H = \frac{V_i^2 \sin(2\theta)}{g} = 780\ m$

#4.



$d_H = \frac{V_i^2 \sin(2\theta)}{g} = 21.2\ m$

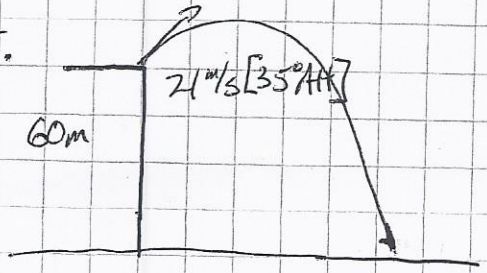
$26 - 21.2 = 4.8\ m$

$t = \frac{2 V_i \sin\theta}{g} = 1.8\ s$

$\frac{1}{2} t = 0.9\ s$

$V = d/t = 4.8\ m / 0.9\ s = 5.3\ m/s$

5.



$V_{iV} = 12.0\ m/s$

$V_H = 17.2\ m/s$

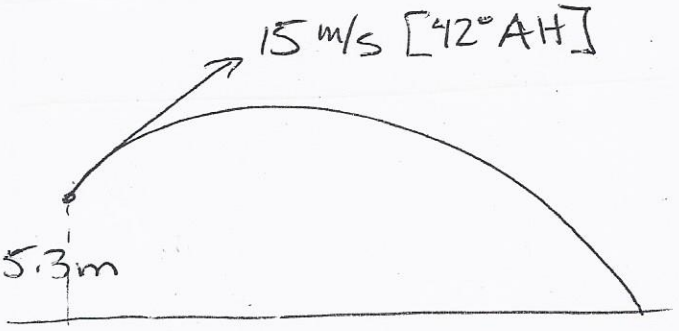
$-60\ m = 12t - 4.9t^2$

$4.9t^2 - 12t - 60 = 0$

$t = 4.93, -2.48$

$\Delta d_H = 17.2\ m/s \times 4.93 = 85\ m$

#6.



$V_{1V} = 10.0\ m/s$

$V_H = 11.15\ m/s$

$-5.3 = 10.0t - 4.9t^2$

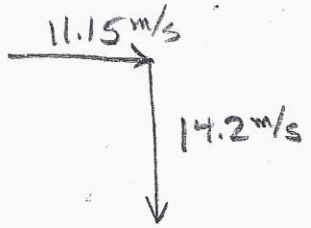
$4.9t^2 - 10.0t - 5.3 = 0$

$t = 2.47, -0.43$

$V_{2V} = V_{1V} + at$

$= 10.0\ m/s + (-9.8)(2.47)$

$= -14.2\ m/s$



$V_2 = 18\ m/s\ [52°\ BH]$.