1: a) $\Delta s = v_0 t + \frac{at^2}{2} \rightarrow y = v_0 t + \frac{gt^2}{2} \rightarrow y = \frac{gt^2}{2}$:

$\Rightarrow 45 = \frac{9,8t^2}{2} \Rightarrow 9,8t^2 = 90 \Rightarrow t^2 = \frac{90}{9,8} = \sqrt{9,18} = \boxed{3,03 s}$

b) $V = \frac{\Delta x}{\Delta t} \Rightarrow \Delta x = 250\,m \cdot 3,03 s \Rightarrow \Delta x = \boxed{757,5\,m}$

c) $v_y^2 = v_{ya}^2 + 2 \cdot a \Delta h \Rightarrow v_y^2 = 2 \cdot 98 \cdot 44,5\,m = AC V = \sqrt{882\,m/s}$

$\Rightarrow v_y = \boxed{29,7\,m/s}$

2:) $c + b \rightarrow a$

$v_a > v_b > v_c$

3: b) $V = V_0 + g.t \Rightarrow V = 0 + 10 . 0,19 \Rightarrow V = 1,9\,m/s$.

$v^2 = v_0^2 + 2g . \Delta h \Rightarrow (1,9)^2 = 0 + 20 \Delta h \Rightarrow 3,61 = 20 \Delta h$

$\Rightarrow 3,61 = 20 \Delta h \Rightarrow \Delta h = \frac{3,61}{20} = \boxed{0,1805\,m \xrightarrow{\times 100} 18,05\,cm.}$

b) $S = S_0 + V.t \Rightarrow S = 0 + 10 . 19 \Rightarrow S = \boxed{1,9\,m}$

$V_0 = 10\,m/s$

$t = 0,19 s$

$S_0 = 0\,m$

4º) a) $d = V_0 \cos\theta . t$

$t = 1{,}50\,s$

$d = 25{,}0\,m$

$\theta = 60{,}0°$

$V_0 = 3{,}33$

$25 = V0 . \cos 60 . 1{,}5 \Rightarrow V_0 = \frac{25}{1.50(\cos(60))} = 3{,}33\ m/s$

$h = V_0 . \operatorname{sen}\theta . t - \frac{g . t^2}{2}$

$h = 3{,}33 . \operatorname{sen} 60 . 1{,}50 - \frac{9{,}8 . 3{,}50^2}{2}$

$h \simeq 32{,}28$

$V_x = V_{0x} \cdot \cos(\theta) = 16{,}67\ m/s$

$V_y = V_{0y} \cdot \operatorname{sen}(\theta) = 14{,}17\ m/s$

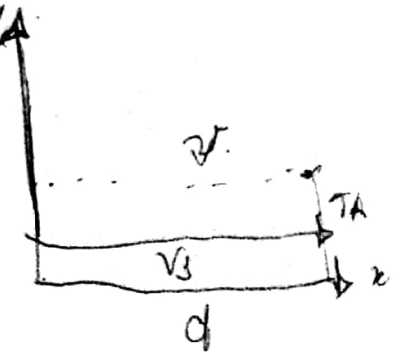
b) $|\vec{V}| = \sqrt{(16{,}67\ m/s)^2 + (14{,}17\ m/s)^2} = 21{,}87\ m/s$

c) $\theta = \operatorname{arctg} = \frac{\operatorname{sen}\theta}{\cos\theta} \Rightarrow \frac{V_y}{V_x} = \frac{14{,}17}{16{,}67} \simeq 40{,}4°$

5º) $V = V_{0x} \Rightarrow V = V_0 . \cos\theta$

$V_0 = 5V$ $\quad V_0 = 5V \cos\theta \Rightarrow \theta = \cos^{-1}(1/5) = \operatorname{arccos}\left(\frac{1}{5}\right) = 78{,}46°$

6º)



$x = x_0 + v_s t$

$d = V_0 . \cos\theta\, t$

$t = \frac{d}{V_0 . \cos\theta} = 2\frac{V_0 . \operatorname{Sen}\theta}{g}$

$d = \frac{v^2 . \operatorname{sen} 2\theta}{g} \Rightarrow \operatorname{Sen} 2\theta = \frac{45{,}7 . 9{,}8\ m/s^2}{460\ m/s} \simeq 2{,}1515 . 10^{-3}$ rad

$h = 45{,}7\,m . tg\, 0{,}0606° \Rightarrow h\ 0{,}0484\,m \Rightarrow h = 4{,}84\,cm$

7°) $6,1\ m/s^2 = v_{oy}^2 - 2 \cdot 9,8 \cdot m/s^2 \cdot 9,1\ m \Rightarrow v_{oy} = 14,7\ m/s$

a) $0 = (14,7\ m/s)^2 - 2 \cdot 9,8\ m/s^2 \cdot h_{máx} \Rightarrow$

$h_{máx} = \frac{443}{40} \Rightarrow \boxed{h_{máx} \approx 11\ m}$

b) $R = v_{ox} \cdot t$ $\qquad 0 = \frac{11 - 9,8\ t^2}{2} \Rightarrow t = 1,5\ s \Rightarrow t_{tot} = 3\ s$

$R = 7,6\ m/s \cdot 3 \approx \boxed{23\ m}$

c) $|\vec{v}| = \sqrt{(7,6\ m/s)^2 + (-14,7\ m/s)^2} = \boxed{17\ m/s}$

d) $\theta = \text{arctg}\left(\frac{v_{3y}}{v_{3x}}\right) \Rightarrow \text{arctg}\left(\frac{-14,7\ m}{7,6\ m}\right) = \boxed{-63°}$

8°) $C = \frac{1}{2} \cdot \frac{g x^2}{v_0^2} = \frac{1}{2} \cdot 9,8\ m/s^2 \cdot \frac{(50\ m)^2}{25\ m/s^2} = 19,6\ m$

$C \cdot tg^2\theta_0 - x\ tg\theta + y + C = 0 \Rightarrow tg\theta_0 = x \pm \frac{\sqrt{x^2 - 4(y+C) \cdot C}}{2 \cdot C}$

$\Rightarrow 50\ m \pm \sqrt{(50\ m^2) - 4 \cdot (3,44\ m \cdot +19,6\ m) \cdot 19,6}$

$32,2\ m$

$tg\theta_0 = 1,99$ { menor angulo: $\theta = 35°$

$tg\theta_v = 0,605$ { maior ângulo é $\theta = 63°$

9.) a)

$v_x = v_0 \cdot \cos\theta = 290 \cdot \cos 30° = 251{,}14 \text{ km/h}$ $\div 3{,}6 = 69{,}76 \text{ m/s}$

$70_x = 69{,}76\, t \Rightarrow t = \boxed{10{,}03 \text{ s}}$

b) $v_{y0} = v_0 \operatorname{sen}\theta \Rightarrow v_{y0} = 290 \cdot \operatorname{sen} 30° = 145 \text{ km/h}$ $\div 3{,}6 = \boxed{40{,}28 \text{ m/s}}$

$-h = -40{,}28 \cdot 10{,}03 - 4{,}9 \cdot (10{,}03)^2$

$\Rightarrow h = 403{,}986 + 492{,}944 \Rightarrow h = \boxed{896{,}9 \text{ m}}$

10)

a) $\vec{v} = \frac{\Delta \vec{s}}{\Delta t} \Rightarrow \Delta \vec{s} = \vec{v} \cdot \Delta t \Rightarrow \Delta s = 2{,}00 \text{ m/s} \cdot 0{,}8 \text{ s} = \boxed{1{,}60 \text{ m}}$

b) $S = 10 - 9{,}8 \text{ m/s}^2 \frac{(0{,}8 \text{ s})^2}{2} = \boxed{6{,}86 \text{ m}}$

c) $0 = 10 - 9{,}8 \text{ m/s}^2 \cdot \frac{t^2}{2} = 1{,}43 \text{ s}$

$\Delta s = 2{,}00 \text{ m/s} \cdot 1{,}43 \text{ s} = \boxed{2{,}86 \text{ m}}$