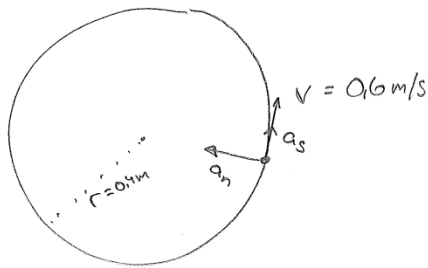<u>Seminariepass II</u>

1.

a) $a_s = 0$

$a_n = \dfrac{v^2}{r} = \dfrac{0.6^2}{0.4} = 0.9 \ m/s^2$
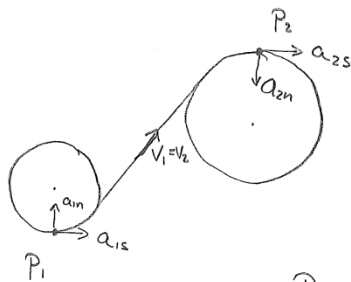
$a = a_n = \underline{0.9 \ m/s^2}$

b) $a_s = 1.2 \ m/s^2$

$a_n = 0.9 \ m/s^2$

$a = \sqrt{a_s^2 + a_n^2} = \sqrt{1.2^2 + 0.9^2} = \underline{1.5 \ m/s^2}$

2.

$a_{1s} = 30 \ m/s^2 = a_{2s}$ (hela kedjan)

$a_{2n} = \dfrac{v_2^2}{r_2} = 40 \ m/s^2$

$\Rightarrow \ v_2 = \sqrt{r_2 a_{2n}} = \sqrt{0.1 \cdot 40} = 2 \ m/s = v_1$

$P_2:$ $\omega_2 = \dfrac{v_2}{r_2} = \dfrac{2}{0.1} = \underline{20 \ rad/s}$

$a_2 = \sqrt{a_{2s}^2 + a_{2n}^2} = \sqrt{30^2 + 40^2} = \underline{50 \ m/s^2}$

$P_1:$ $\omega_1 = \dfrac{v_1}{r_1} = \dfrac{2}{0.05} = \underline{40 \ rad/s}$

$a_{1n} = \dfrac{v_1^2}{r_1} = \dfrac{2^2}{0.05} = 80 \ m/s^2$

$a_1 = \sqrt{a_{1s}^2 + a_{1n}^2} = \sqrt{30^2 + 80^2} = \underline{85.4 \ m/s^2}$

3. $y = y_0 + v_{0y}t - \tfrac{1}{2}gt^2$

$\Rightarrow y = y_0 - \tfrac{1}{2}gt^2$ ①

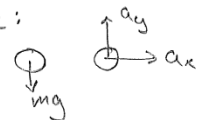$x = x_0 + v_{0x}t \Rightarrow x = v_{0x}t \Rightarrow t = \dfrac{x}{v_{0x}}$ ②

②i①: $y = y_0 - \tfrac{1}{2}g\dfrac{x^2}{v_{0x}^2}$ (kastparabel)

$v_{0x} = \sqrt{\dfrac{gx^2}{2(y_0 - y)}} = \sqrt{\dfrac{g \cdot 6^2}{2(8-4)}} = \underline{6.6 \ m/s}$

A→C: $x = \sqrt{\dfrac{2v_{0x}^2(y_0 - y)}{g}} = \sqrt{\dfrac{2 \cdot 6.6^2 \cdot 8}{g}} = 8.5 \ m \Rightarrow d = x - 6 = \underline{2.5 \ m}$

Kaströrelse:

$(\rightarrow) \ 0 = a_x$

$(\uparrow) \ -mg = ma_y \Rightarrow a_y = -g$