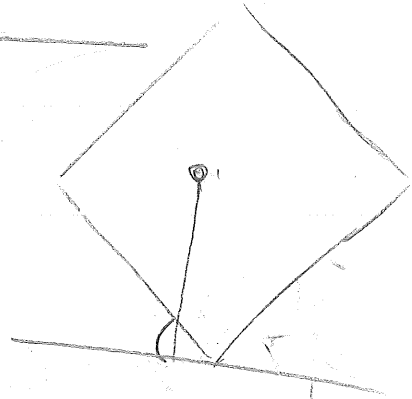
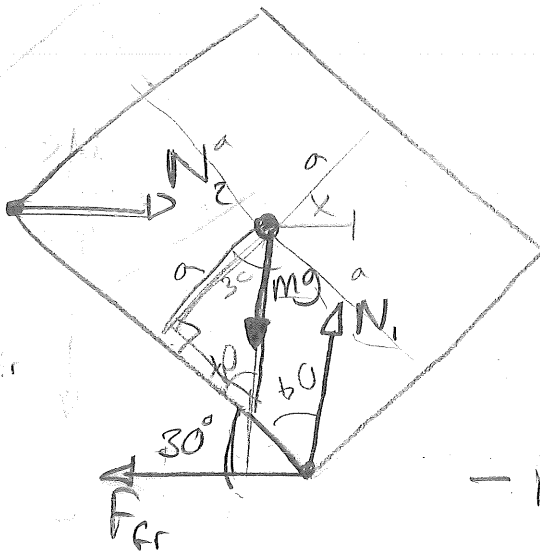
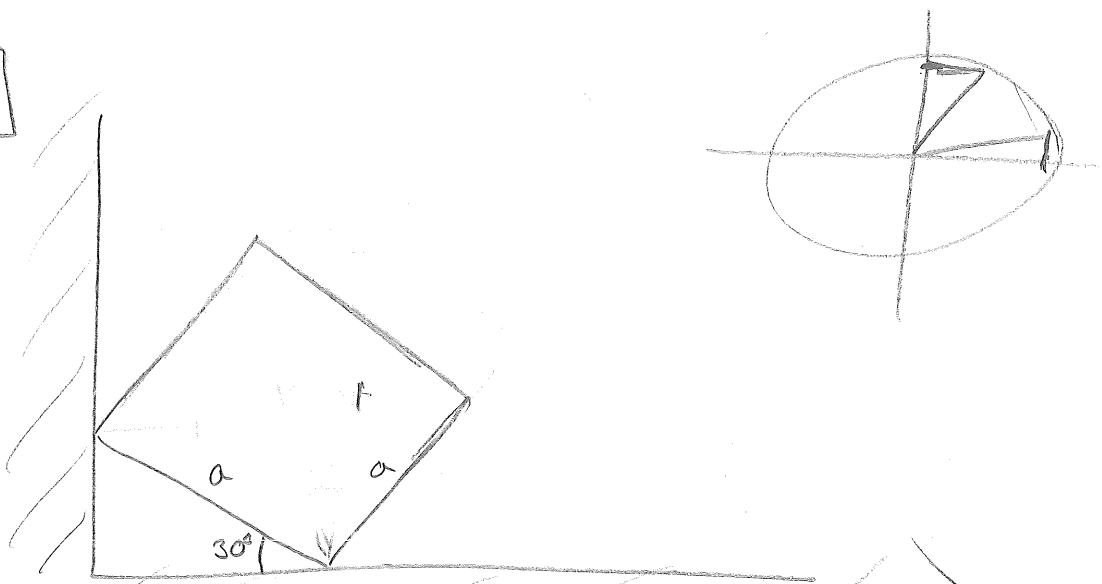


5.2



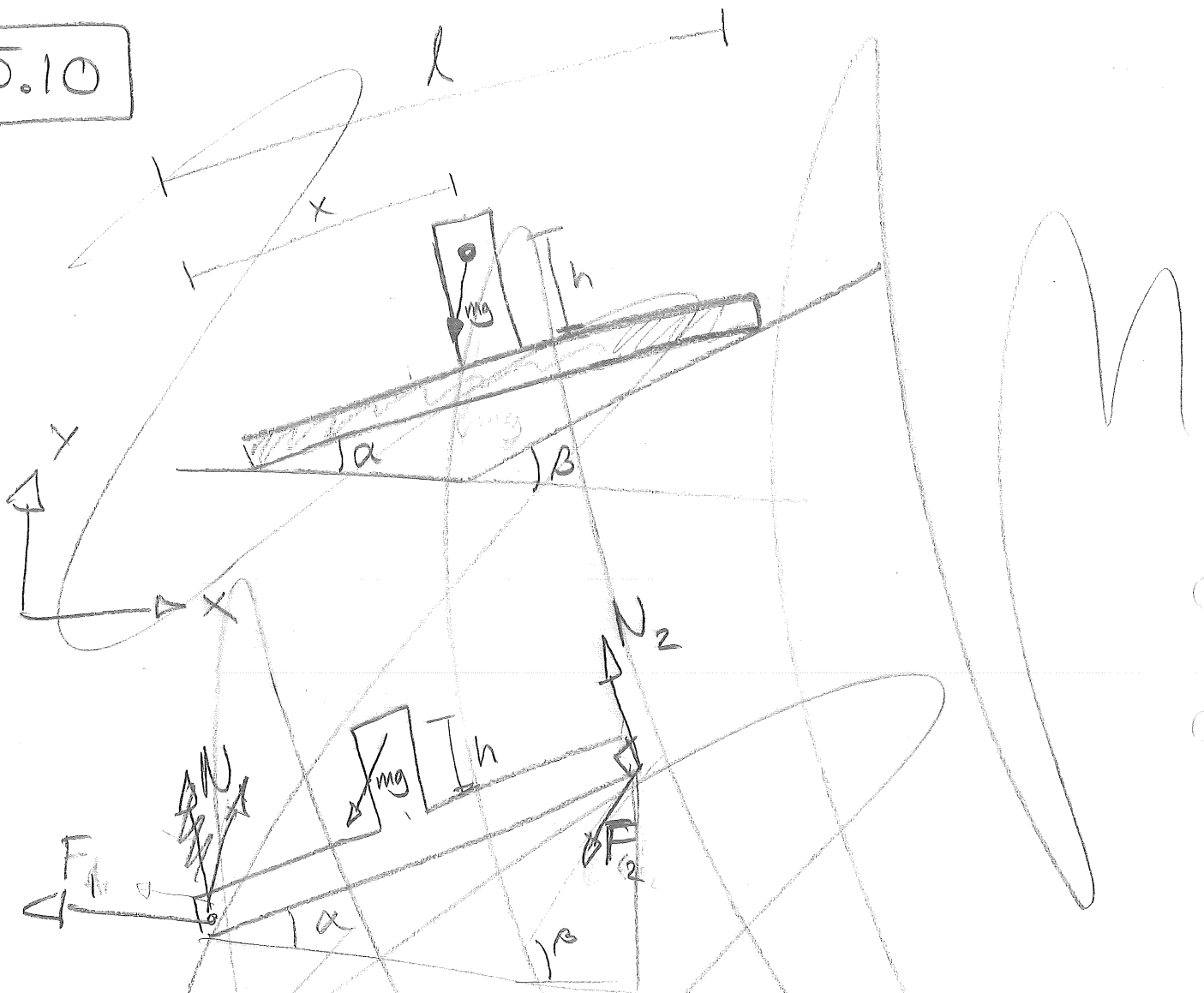
$$-mg \cdot x + N_2 \cdot 2a \sin 30^\circ = 0$$

$$x = (a - a \tan 30^\circ) \cdot \cos 30^\circ$$

$$F_{fr} = \mu \cdot N_1 = \mu \cdot mg = \mu \cdot \frac{N_2 \cdot 2a \sin 30^\circ}{a(1 - \tan 30^\circ) \cos 30^\circ} = \mu \cdot \frac{N_2 \tan 30^\circ}{1 - \tan 30^\circ}$$

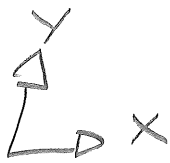
$$\mu = \frac{1 - \tan 30^\circ}{2 \tan 30^\circ} = \frac{1 - \frac{1}{\sqrt{3}}}{\frac{2}{\sqrt{3}}} = \frac{\sqrt{3} - 1}{2} = \frac{1}{2}(\sqrt{3} - 1)$$

5.10

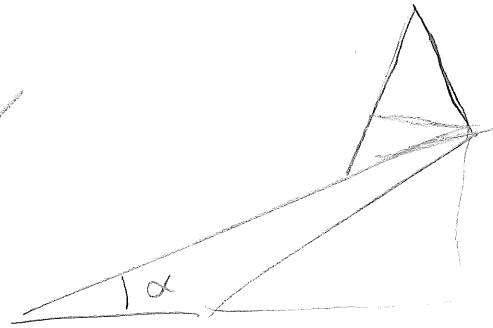
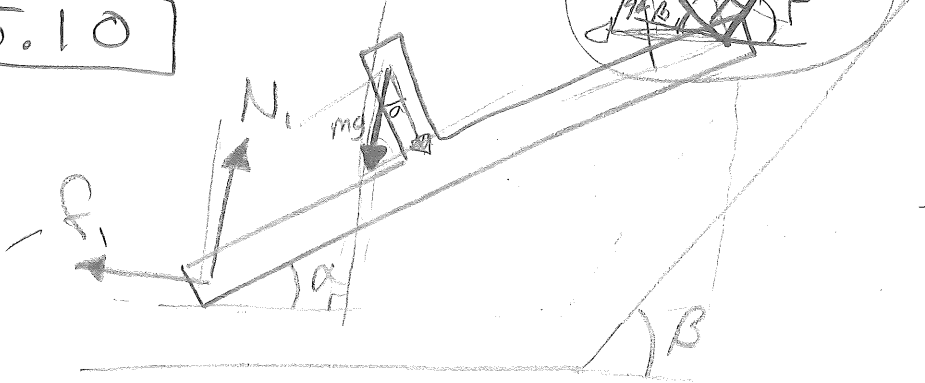


$$\sum F_x = 0 \Rightarrow -F_1 - N_1 \sin \alpha - F_2 \sin \beta$$

~~scribble~~



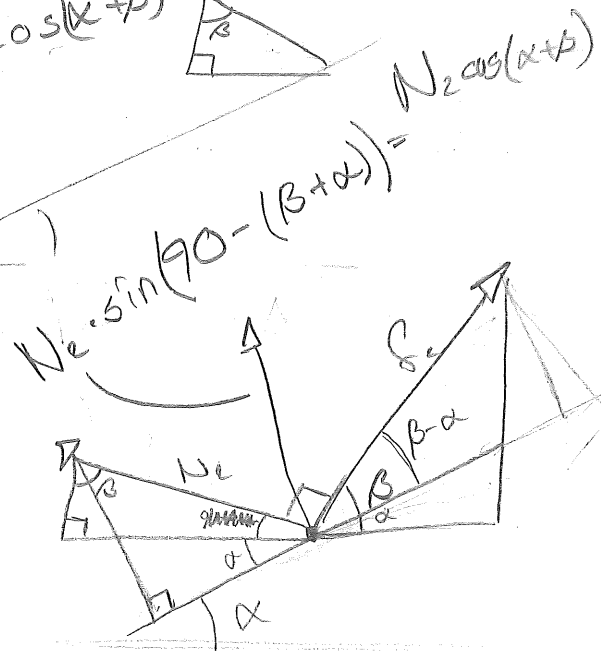
5.10



$$f_1 - N_2 \sin \beta + f_2 \cos \beta = 0$$

$$N_1 - mg + N_2 \cos \beta + f_2 \sin \beta = 0$$

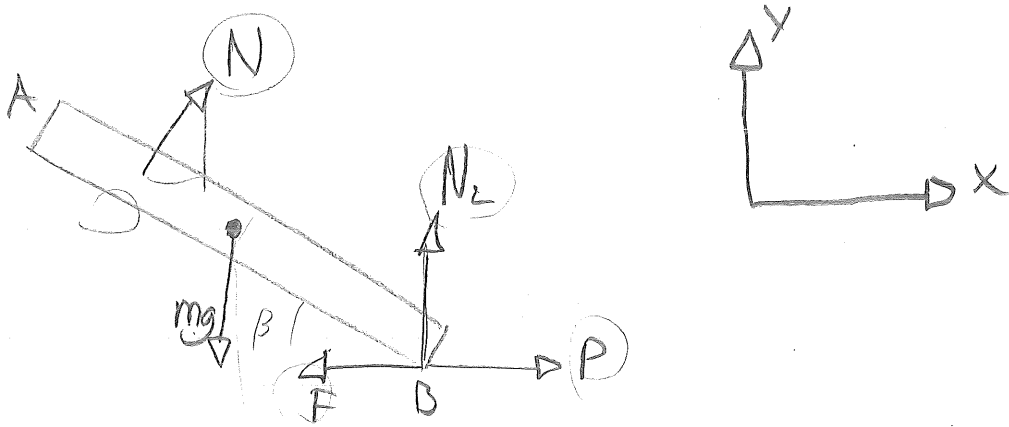
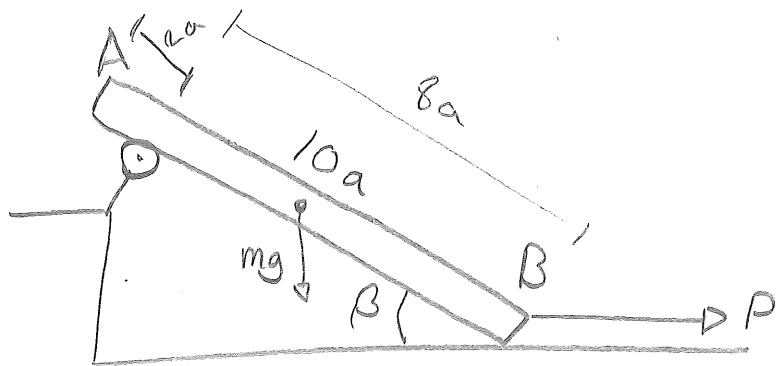
(X) $mg \cos \alpha - hmg \sin \alpha - (N_2 \cos(\alpha + \beta) - f_2 \sin(\beta - \alpha))$



$N_2 = f_2$



5.15



$$\begin{cases} \sum F_x = 0 \Rightarrow P - F + N \sin \beta = 0 \\ \sum F_y = 0 \Rightarrow N_2 + N \cos \beta - mg = 0 \\ \sum \overset{\curvearrowright}{M}_B = 0 \Rightarrow N \cdot 8a - mg \cdot 5a \cos \beta = 0 \end{cases}$$

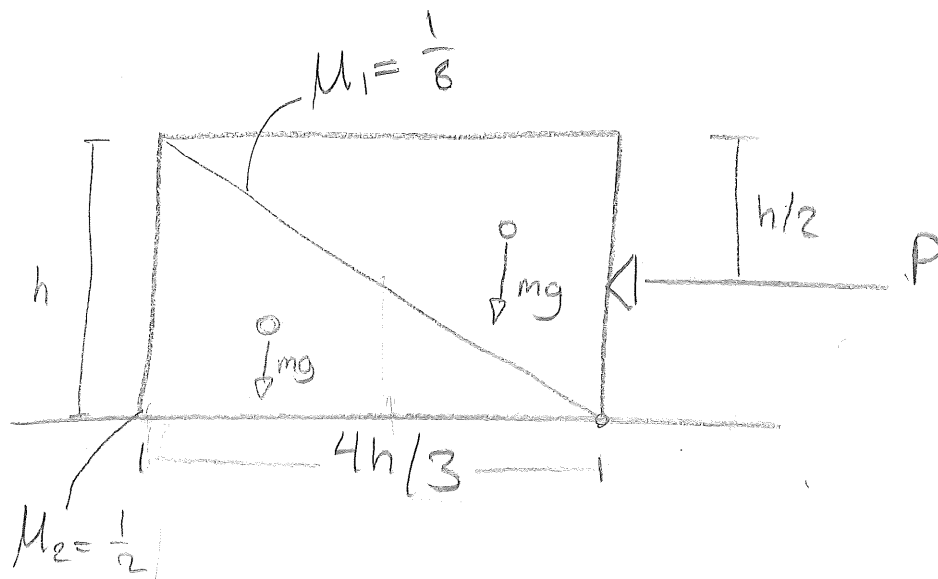
• $P = N_2 \cdot \mu - N \cdot \sin \beta$

$$N = \frac{5mg \cos \beta}{8}$$

$$N_2 = mg - \cos \beta \cdot \frac{5mg \cos \beta}{8}$$

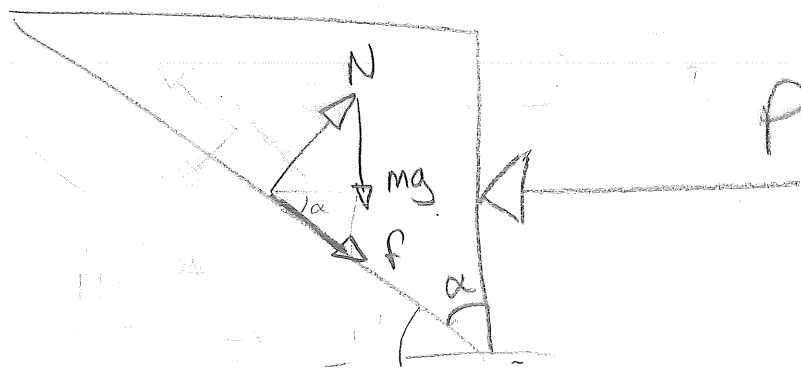
$$P = mg \left(\mu \left(1 - \frac{5 \cos^2 \beta}{8} \right) - \frac{5 \cos \beta \sin \beta}{8} \right)$$

5.21



$$\tan \alpha = \frac{4}{3}$$

$$f = \frac{1}{8} N$$



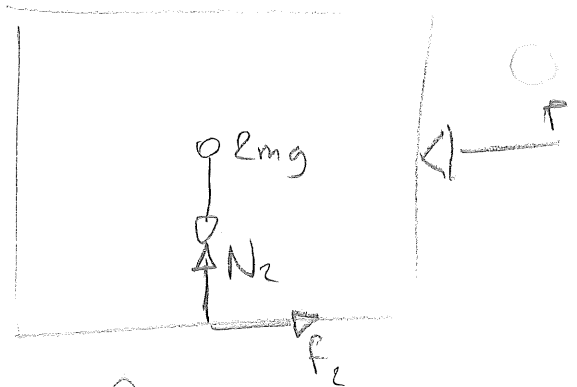
$$f \cdot \sin \alpha + N \cos \alpha - P = 0$$

$$-mg + N \sin \alpha - f \cos \alpha = 0 \Rightarrow mg = f(8 \sin \alpha - \cos \alpha)$$

$$P = f(\sin \alpha + 8 \cos \alpha)$$

$$P = \frac{mg(\sin \alpha + 8 \cos \alpha)}{8 \sin \alpha - \cos \alpha} =$$

$$= \frac{28}{29} mg$$



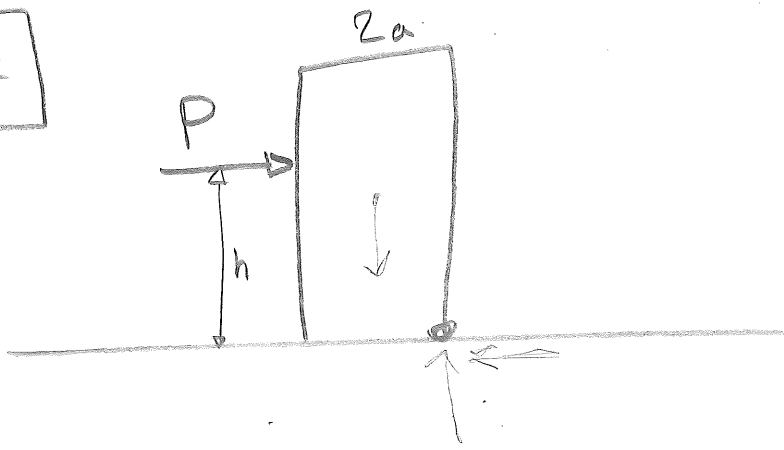
$$P = f_2$$

$$N_2 = 2mg$$

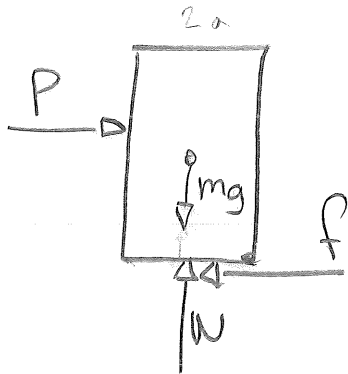
$$f_2 = 2mg \cdot \frac{1}{2} = mg$$

$$P \geq mg/2$$

5.27



friläggning:



a) $P = f$

$mg = N$

$$Ph + mg \cdot a - N \cdot \square = 0$$

$$\Rightarrow \square = \frac{Ph + mga}{N} = \frac{Ph + mga}{mg} = \frac{Ph}{mg} + a$$

b) $f = \mu \cdot N = \mu \cdot mg = P$

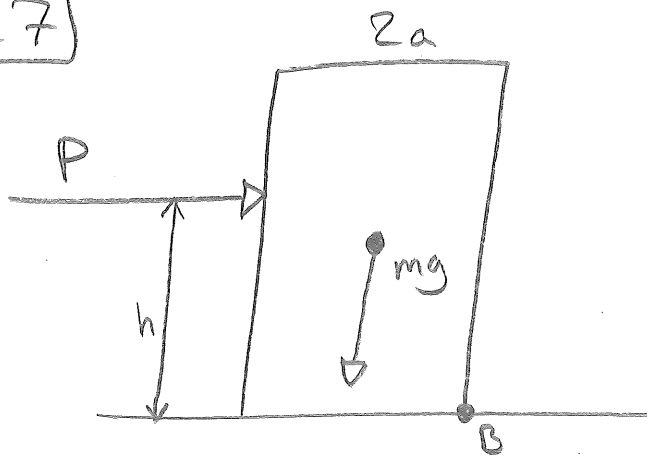
c) $Ph + mga = 2mga \Rightarrow P = \frac{mga}{h}$

d)

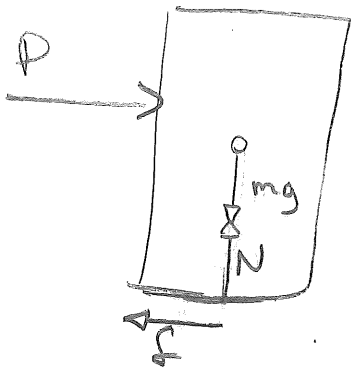
$$f \leq \frac{mga}{h}$$

$$\mu \leq \frac{a}{h}$$

5.27



$$M_B = 0 \Rightarrow P \cdot h - mg a = 0$$



$$P - f = P - mg \mu = 0 \Rightarrow P = mg \mu$$

$$mg(\mu \cdot h - a) = 0$$