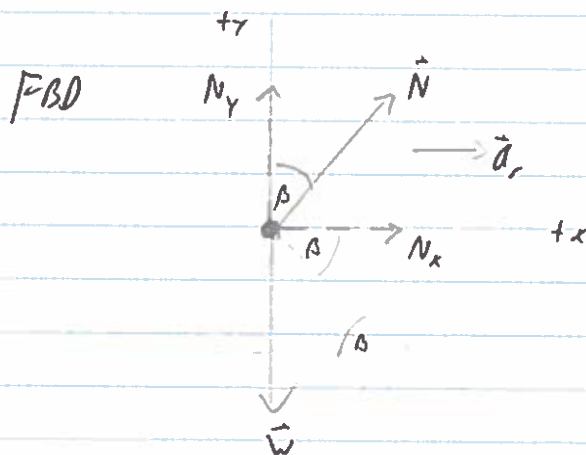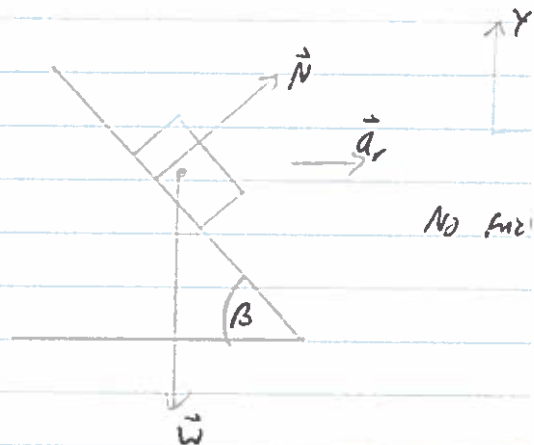Ex 5.22
. p 157

No fric

$N_x = N \sin \beta$
$N_y = N \cos \beta$

FBD

NⅡ along radial axis:

$$\Sigma F_r = ma_r = \frac{mv^2}{r} = N_x = N \sin \beta$$

$$\frac{mv^2}{r} = N \sin \beta \qquad \text{(A)}$$

NI along y-axis:

$$\Sigma F_y = 0 = N_y - W = N \cos \beta - mg = 0$$

$$mg = N \cos \beta \qquad \text{(B)}$$

B)

$$\frac{mv^2}{r} \frac{1}{mg} = \frac{N \sin \beta}{N \cos \beta}$$

$$\tan \beta = \frac{v^2}{rg}$$

$$\beta = \tan^{-1} \left(\frac{v^2}{rg} \right)$$

$$= \tan^{-1} \left(\frac{(25 \, ms^{-1})^2}{(230 \, m)(9.8 \, ms^{-2})} \right)$$

$$\beta = 15°$$