A)

$$n = \frac{1}{3} = \frac{N_1}{N_2}$$

$N_1 = 25$

$N_2 = 3N_1 = 3(25) = 75$

$N_2 \rightarrow$ Rueda

$dp = m_2 N_2 = 4 \cdot 75 = 300\,mm$

$db = m_2 N_2 \cos\theta = 4 \cdot 75 \cdot \cos(20°) = 281,9\,mm$

$de = dp + 2m = 300 + 8 = 308\,mm$

$dr = dp - 2,5m = 300 - 10 = 290\,mm$

$N_1 \rightarrow$ Piñón

$dp = m_1 N_1 = 4 \cdot 25 = 100\,mm$

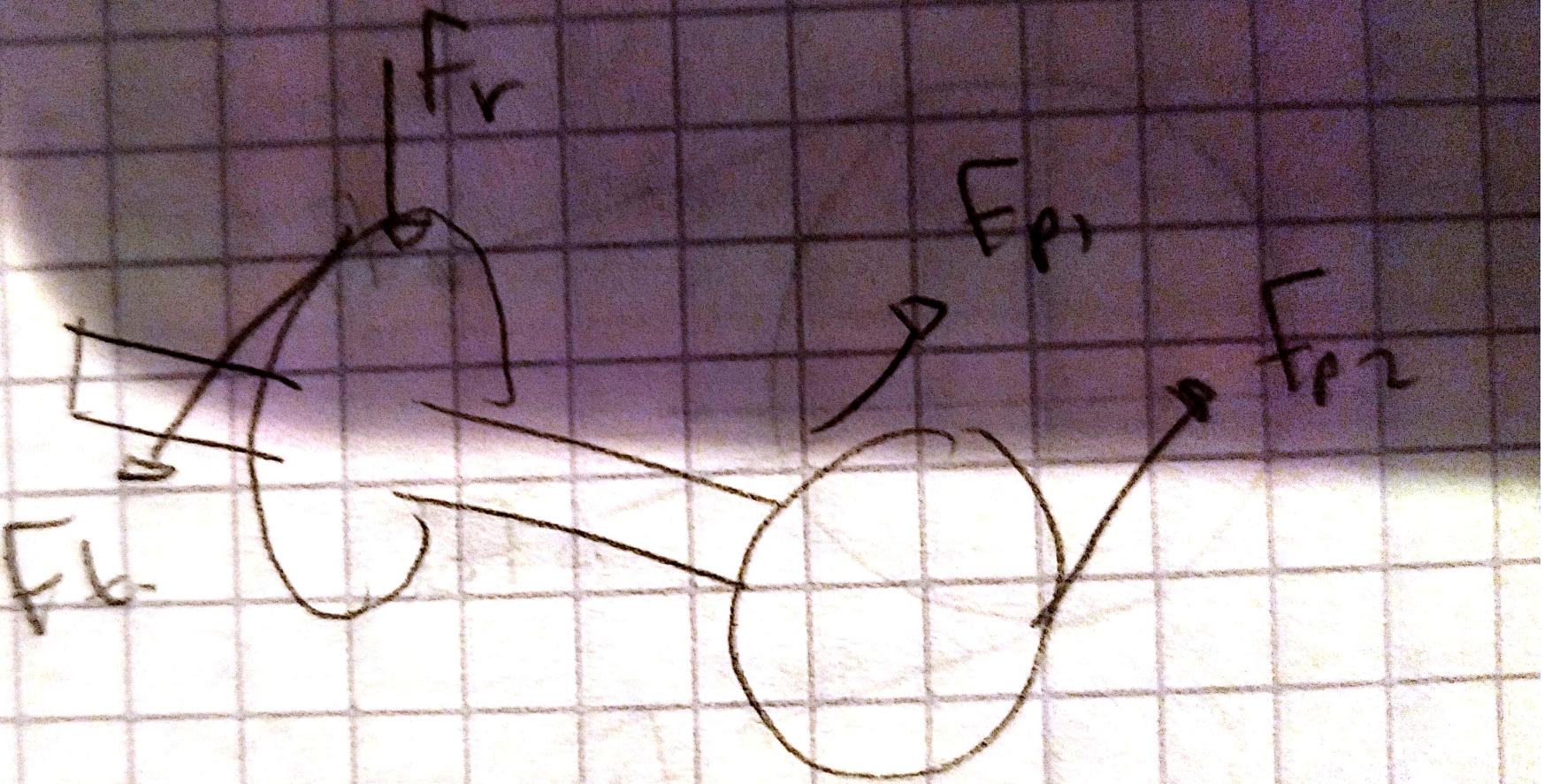
$db = m_1 N_1 \cos\theta = 4 \cdot 25 \cdot \cos(20) = 93,97\,mm$

$de = dp + 2m = 100 + 8 = 108\,mm$

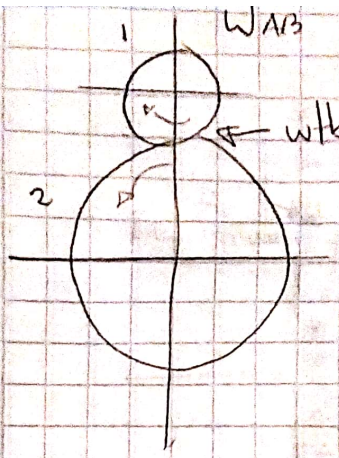
$dr = dp - 2,5mm = 100 - 10 = 90\,mm$

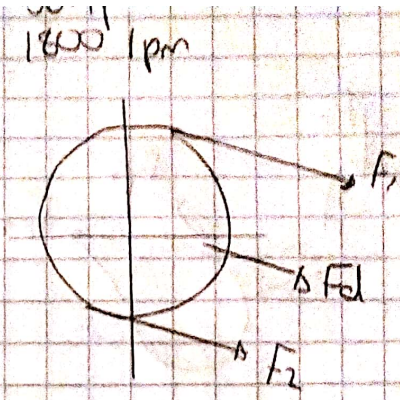
$$dc = \frac{dp_1 + dp_2}{2} = \frac{300 + 100}{2} = 200mm$$

B



B





$$T_1 = \frac{63000(30)}{1800} = 1050 \text{ lb in}$$

T_2

$$W_{t_1} = \frac{T_1}{r_b} = \frac{1050}{d_{p1}/2} = \frac{1050}{50} = 21 \text{ lbf.} \leftarrow F_{bx}$$

$W_{R_1} = 7{,}64 \text{ lbf} \downarrow F_{by}$

$$\frac{T_2}{R_2} = \frac{1050}{150} = 7 \text{ lbf.} = F_1 - F_2$$

$$F_1 + F_2 = 1{,}5\,(F_1 - F_2) = 1{,}5(7) = 10{,}5 = F_d$$

$$F_{Dx} = F_D \cos 40^\circ = 8{,}04 \text{ lbf}$$

$$F_{Dy} = F_D \sin 40^\circ = 6{,}74 \text{ lbf}$$