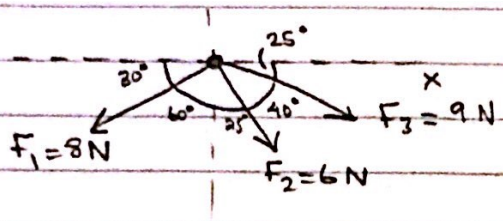
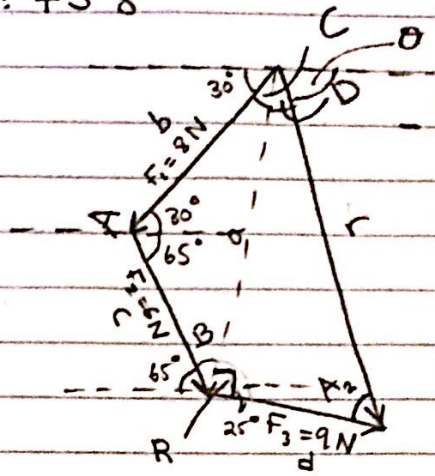
Assignment 1

3 last digids of student ID: 758

FBD





- Finding B°:

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin 95}{10.41} = \frac{\sin B}{8}$$

$B = 50°$

- Finding R°

$180 - (65 + 50) = 60 + 25$

$R = 90°$

a) using trigonometry

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 8^2 + 6^2 - 2(8)(6)\cos 95$

$a = 10.41\,N$

$r^2 = a^2 + d^2 - 2(a)(d)\cos R$

$r^2 = (10.41)^2 + 9^2 - 2(10.41)(9)\cos 90°$

$r = 13.7\,N$

- finding the angle of resultant:

$180 - (30 + C + D) = \theta$

$\cos C = \frac{c^2 - a^2 - b^2}{-2bc} \Rightarrow \cos C = \frac{6^2 - (10.41)^2 - 8^2}{-2(8)(6)} \Rightarrow \cos^{-1} C = \frac{-136}{-96} = 35°$

$\cos D = \frac{d^2 - a^2 - r^2}{-2ar} \Rightarrow \cos D = \frac{9^2 - (10.41)^2 - (13.7)^2}{-2(10.41)(13.7)} \Rightarrow \cos^{-1} D = \frac{-215}{-285} = 41°$

$\theta = 180(30 + 35 + 41) = 74°$

ANS. $R = 13.7\,N\,@\,\overline{\downarrow}^{74°}$

b) using components

$R = \sqrt{\Sigma F_x^2 + \Sigma F_y^2}$

$\Sigma F_x = F_{1,x} + F_{2,x} + F_{3,x}$

$F_{1x} = -(8\cos 30)$

$F_{2x} = +(6\cos 65)$

$F_{3x} = +(9\cos 25)$

$\Sigma F_x = -8\cos 30 + 6\cos 65 + 9\cos 25$

$\Sigma F_x = 3.76\,N$

$\Sigma F_y = F_{1,y} + F_{2,y} + F_{3,y}$

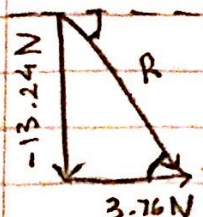
$F_{1,y} = -(8\sin 30)$

$F_{2,y} = -(6\sin 65)$

$F_{3,y} = -(9\sin 25)$

$\Sigma F_y = -8\sin 30 - 6\sin 65 - 9\sin 25$

$\Sigma F_y = -13.24\,N$



$R = \sqrt{(3.76)^2 + (-13.24)^2}$

$R = 13.76$

$\theta = \tan^{-1}\left(\frac{13.24}{3.76}\right)$

$\theta = 74°$

ANS. $R = 13.7\,N\,@\,\overline{\downarrow}^{74°}$