Quiz 1

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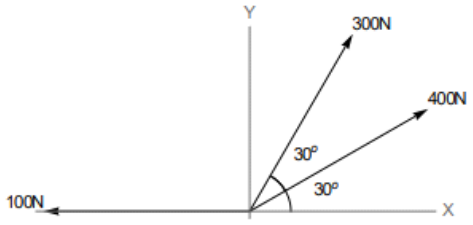
Problem 1:

Consider the three vectors pictured to the right. Determine the following:

a. The components of the resultant force vector
b. The magnitude and direction of the resultant force vector (angle measured ccw from positive x-axis)



A.)

$$F_1 = 400\cos(30)\,i + 400\sin(30)\,j$$
$$F_2 = 300\cos(60)\,i + 300\sin(60)\,j$$
$$F_3 = -100\,i + 0\,j$$
$$+$$

$$\boxed{F_R = 396.41\,i + 459.81\,j}$$

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b.) x-direction

$$-100 + 300\cos(60) + 400\cos(30) = F_{Rx}$$

$$F_{Rx} = 396.41\ N$$

y-direction

$$0 + 300\sin(60) + 400\sin(30) = F_{Ry}$$

$$F_{Ry} = 459.81\ N$$

$$F_R = \sqrt{F_{Rx}^2 + F_{Ry}^2}$$

$$F_R = \sqrt{(396.41)^2 + (459.81)^2}$$

$$\boxed{F_R = 607.09\ N}$$

$$\tan(\theta) = \frac{459.81}{396.41}$$

$$\boxed{\theta = 49.23^\circ}$$