

# Solucion de problemas de tarea I

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## Abstract

En este documento se encuentran resueltos los problemas de la unidad 1

## Ejercicio 4

Tenemos los siguientes vectores

$$\vec{U} = (-5\hat{i} + 1\hat{j} - 7\hat{k})m, \vec{V} = (3\hat{i} - 7\hat{j} - 11\hat{k})N \quad (1)$$

Entonces para realizar la suma hacemos lo siguiente:

$$|\vec{U}| = 8.66 \quad (2)$$

$$|\vec{V}| = 13.37 \quad (3)$$

Ahora, para calcular el resultante utilizamos la siguiente expresión:

$$|\vec{U} * \vec{V}| = (-15 - 7 + 77) = 55 \quad (4)$$

$$Cos\theta = 55/(8.66)(13.37) \quad (5)$$

Nos da el resultado de .47

$$\theta Cos^{-1}(.47) = 61.63$$

$$M = (8.66)(13.37)(Sen61.63)$$

$$M = 84.82N * M$$

### Problema 3

The image shows handwritten notes for a physics problem. At the top left, it says "Ejercicio 3". Below that is a free body diagram of a block on a horizontal surface. A vertical dashed line extends from the center of the block upwards. A horizontal force  $F_x = 100 \text{ N}$  acts to the right at the top of the block. A horizontal force  $F_y = 200 \text{ N}$  acts to the right at the bottom of the block. A vertical force  $F_z = 300 \text{ N}$  acts downwards at the center of the block. A normal force  $N_0$  acts vertically upwards at the center of the block. A friction force  $F_f$  acts horizontally to the left at the bottom of the block. A coefficient of friction  $\mu_0 = \mu_k$  is given.

Equations derived from the free body diagram:

$$F_x = 100 \text{ N} + 200 \text{ N} + 300 \text{ N} = 600 \text{ N}$$
$$\sum F_y = N_0 - F_z = 600 \text{ N}$$
$$N_0 = 600 \text{ N}$$
$$600 \text{ N} = 200 \text{ N} + 600 \text{ N} + 300 \text{ N}$$
$$600 \text{ N} = 1700 \text{ N}$$
$$\frac{1}{\mu_0} = \frac{1700 \text{ N}}{600 \text{ N}} = \frac{17}{6}$$
$$N_0 = (C_x F_x + C_y F_y) / k_m$$
$$F_f = 300 \text{ N}$$
$$F_f = 300 \text{ N}$$

Figure 1: Este es el problema 3

### Ejercicio Numero 2

Datos

$$A_x = 6 * \cos 30^\circ = 5.19$$

$$A_y = 6 * \sin 30^\circ = 3$$

$$B_x = -5 * \cos 40^\circ = -3.83$$

$$B_y = 5 * \sin 40^\circ = 3.21$$

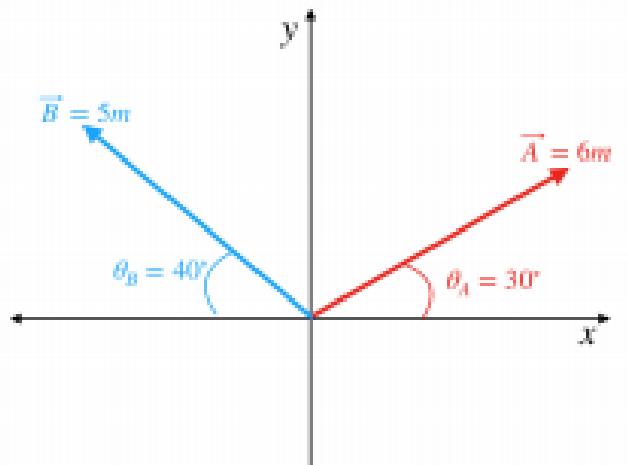


Figure 2: Problema numero 2

$$F_x = 1.36 \quad (6)$$

$$F_y = 6.21 \quad (7)$$

Magnitud

$$(\sqrt{(1.36)^2 + (6.21)^2}) = 6.35N \quad (8)$$

$$\theta = \tan^{-1} \frac{F_y}{F_x} = \tan^{-1} \frac{1.36}{6.21} = 12.35^\circ \text{ Es el resultado}$$