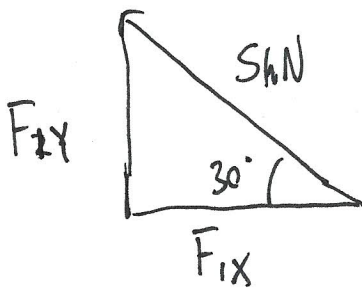**Question 2:**
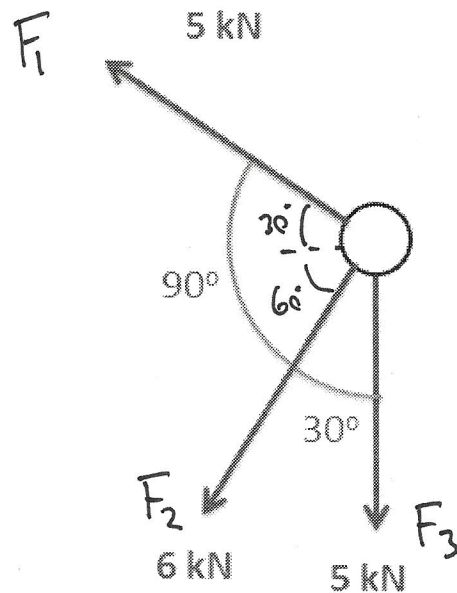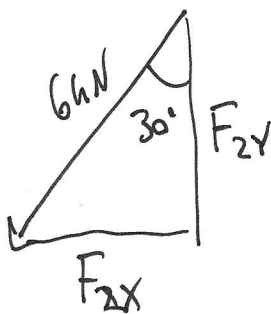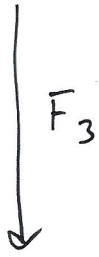
Determine the sum of the force vectors in the diagram below. Give the
sum in terms of a magnitude and a direction.

$F_1$  5 kN

$30°$

$90°$  $60°$

$30°$

$F_2$

6 kN

$F_3$

5 kN

$F_{1X} = -5\cos(30) = -4.33 \, kN$

$F_{1Y} = 5\sin(30) = 2.5 \, kN$

5kN

$F_{2Y}$

$30°$

$F_{1X}$

6kN

$30°$ $F_{2Y}$

$F_{2X}$

$F_{2X} = -6\sin(30) = -3 \, kN$
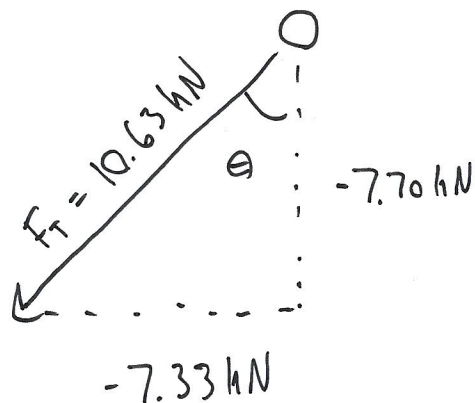
$F_{2Y} = -6\cos(30) = -5.20 \, kN$

$$F_{3X} = 0$$

$$F_{3Y} = -5hN$$

$\downarrow F_3$

$$F_{TX} = F_{1X} + F_{2X} + F_{3X}$$

$$F_{TX} = -4.33 - 3 + 0 = -7.33hN$$

$$F_{TY} = F_{1Y} + F_{2Y} + F_{3Y}$$

$$F_{TY} = 2.5 - 5.20 - 5 = -7.70hN$$



$$|F_T| = \sqrt{(-7.33)^2 + (-7.70)^2}$$

$$\boxed{|F_T| = 10.63}$$

$$\theta = \tan^{-1}\left(\frac{7.33}{7.70}\right)$$

$$\boxed{\theta = 43.6°}$$

$F_T = 10.63hN$

$\theta$

$-7.70hN$

$-7.33hN$