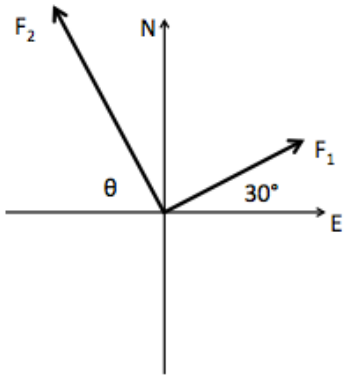
Solutions to the practice problems for Chapter 5

1) I want the acceleration to be in the N direction. This means that the horizontal component of the acceleration must be =0.



Applying Newton's law:

$F_{1x}+F_{2x}=0 \rightarrow (100\ N)*Cos(30°)-(200\ N)*Cos\theta=0 \rightarrow 86.6N=(200\ N)*Cos\theta \rightarrow \theta=64.5°$

(Answer B).

2) If an object moves with constant velocity, its acceleration is zero. This means that there is no net-force acting on the object. (Answer A).

3) We apply Newton's equation to the case of the elevator:

N-mg=ma.

N is the normal force (the apparent weight). mg is the real weight.

We have that: ma=N-mg=121 N-142 N= -21 N.

In order to calculate the acceleration, we need m. We can extract it from the information that we have about the weight:

$W=mg=142\ N \rightarrow m=W/g= 142N/9.81\ m/s^2=14.5\ kg.$

We get: $a=-21N/14.5kg=-1.45\ m/s^2= 1.45\ m/s^2$ down. (Answer D).

4) The acceleration in the horizontal direction can be obtained calculating the horizontal component of the force acting on the crate.

$F_x=ma=10.0N*Cos20°=9.40\ N \rightarrow a=F_x/m = 0.188\ m/s^2$ (Answer C).

5) Her apparent weight is given by the normal force.

Newton's law: N-mg=ma → N=mg+ma=m(g+a)=615 N (Answer A)