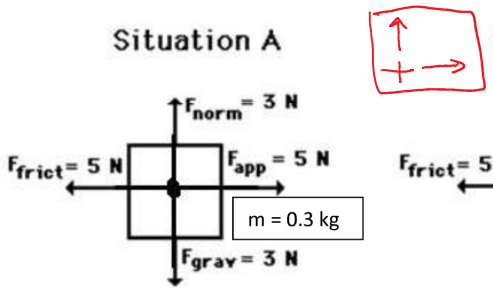
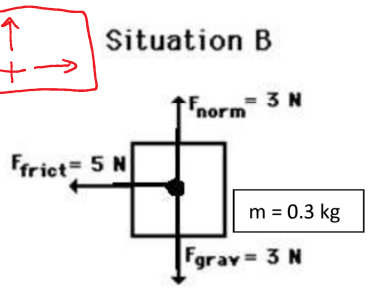
Wednesday, November 6, 2019 7:34 AM

Free-Body Diagrams and Newton's 2nd Law

1. Free-body diagrams for four situations are shown below. For each situation, determine the net horizontal and vertical force acting upon the object. Also, if there is a net force, determine the direction of the acceleration.



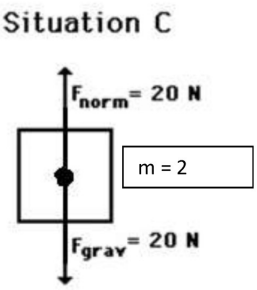


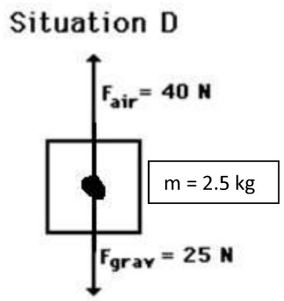
$F_{NET,y} = F_N + F_g$
$= 3N + (-3N)$
$F_{NET,y} = 0N$

$F_{NET,x} = F_A + F_f$
$= 5N + (-5N)$
$F_{NET,x} = 0N$

$F_{NET,y} = F_N + F_g$
$= 3N + (-3N)$
$F_{NET,y} = 0N$

$F_{NET,x} = F_f$
$F_{NET,x} = -5N$ LEFT
a IS TO THE LEFT

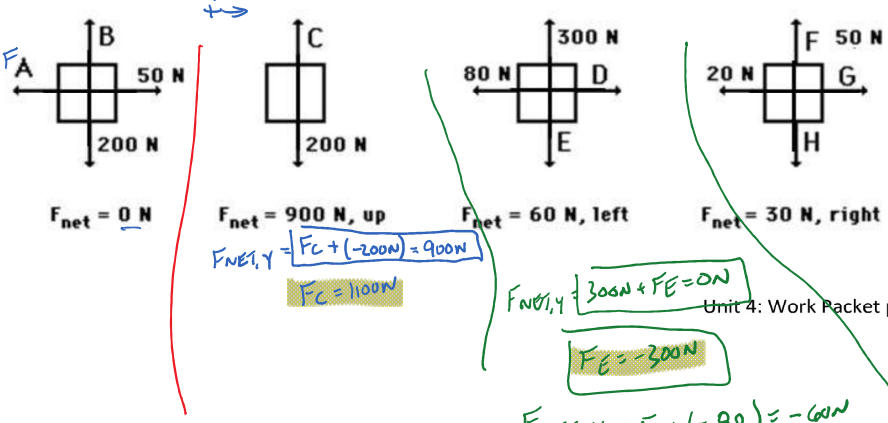




$F_{NET,y} = F_N + F_g$
$= 20N + (-20N)$
$F_{NET,y} = 0N$

$F_{NET,y} = F_{AIR} + F_g$
$= 40N + (-25N)$
$F_{NET,y} = +15N$ UP
a IS UP

2. Free-body diagrams for four situations are shown below. The net force is known for each situation. However, the magnitudes of a few of the individual forces are not known. Analyze each situation individually and determine the magnitude of the unknown forces.



$F_{NET,x} = F_A + 50N = 0N$
$F_A = -50N$

$F_{NET,y} = F_B + (-200N) = 0N$
$F_B = 200N$

$F_{NET,y} = F_C + (-200N) = 900N$
$F_C = 1100N$

$F_{NET,y} = 300N + F_E = 0N$
$F_E = -300N$

$F_{NET,x} = F_D + (-80) = -60N$
$F_D = 20N$

$F_{NET,y} = 50N + F_H = 0N$
$F_H = -50N$

$F_{NET,x} = F_g + (-20N) = 30N$
$F_g = 50N$