Forces Review

1) **Find the net force or $\sum F$**

   $a = 5 \, m/s^2$

   3 kg

2) **Find the net force or $\sum F$**

   $a = 4 \, m/s^2$

   10 kg
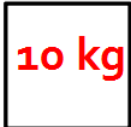
3) **Find the missing piece**

   $F_{net} = 14 \, N$

   $a = ? \, m/s^2$

   7 kg

4) **Find the missing piece**

   $\sum F = 45 \, N$
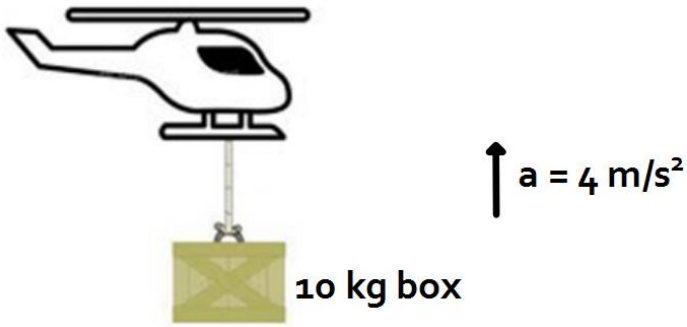
   $a = 9 \, m/s^2$

   ? kg

5) **Find the net force and then calculate the acceleration of each box**

   12 N   8 N
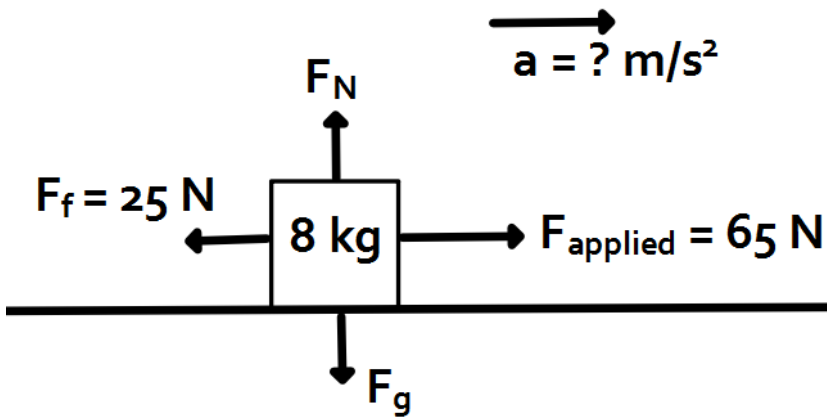
   4 kg

6) **Find the force of gravity of the box, then find the net force, and then calculate the acceleration of each box**

   100 N

   50 kg
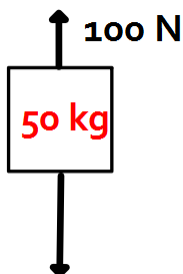
7) **Find the force of gravity of the box,** Find the net force, Find the Tension in the rope

$\uparrow$ a = 4 m/s²

10 kg box

8) **Find Force of gravity,** Find Normal Force, Find Net Force, Find the acceleration of the box

$\overrightarrow{}$
a = ? m/s²

F_N

F_f = 25 N
8 kg $\longrightarrow$ $F_{applied}$ = 65 N

F_g

9) **Find Force of gravity,** Find Normal Force, Find Net Force, Find the Frictional Force

$\overrightarrow{}$
a = 4 m/s²

F_N

F_f
5 kg $\longrightarrow$ $F_{applied}$ = 60 N

F_g

Momentum Problems (Use your momentum charts to answer the following questions)

1. A 1500-kg car traveling east at 20 m/s collides with a moving 2500-kg truck. After they collide, the two interlock and move together with a velocity of 30 m/s west. What was the original velocity of the truck?

2. A 4-kg gun shoots a 0.1-kg bullet at 400 m/s. Find the recoil speed of the gun.

3. Two carts roll toward each other on a frictionless track. Cart A has mass 800kg and speed 5m/s. Cart B has mass 200kg and speed 5m/s.
    a. If the 2 carts undergo an inelastic collision, what is the magnitude and direction of their final velocity?

4. A 0.2 kg cue ball traveling to the right at 3 m/s collides head on with the **8** ball, which is initially at rest. After they collide, the **8** ball moves to the right at 3 m/s. How fast, and in what direction will the cue ball be moving after the collision?

5. A 1000kg car moving east at 5m/s collides with a 2000kg car moving east at 2m/s. After the collision, the 2000kg car moves east at 5m/s.

   a. Find the final velocity of the 1000kg car.

6. Two sumo wrestlers run towards each other, the first has a mass of 150kg and is running at 14m/s. The second wrestler has a mass of 200kg and is running with a speed of 18m/s. They collide in a perfectly elastic collision. If the second wrestler bounces backwards at 4m/s. Find the final velocity of the first wrestler.