FBD, Fnet and Fg Practise Problems - Classwork (not in text)

Remember –> Bird's eye views and horizontal views

1. Draw a FBD & calculate Fnet for each of the following:

a) A pencil being lifted up with 2 N and experiencing air resistance of 0.5 N **{ Fnet = 1.5 N [up] }**

An unbalanced force means its speeding up

b) A 75 kg parachutist is falling due to gravity, while the chute provides air resistance of 735 N [up]. (hint: find Fg!)

{ Fnet = 0 N } * it would fall at constant v!

A balanced force means no change in motion

c) A car being pushed with 560 N [fwd] while experiencing road/air friction of 550 N [backwards]. The weight of the car is 10,000 N. **{ Fnet = 10 N [fwd] }**

An unbalanced force means its speeding up.

2. A hockey player is checked by 2 defensemen. He experiences a force of 600 N [W] and 675 N [N]. Draw the FBD and calculate Fnet. **{ Fnet = 903 N [W 48° N] }**

3. A particularly large rock has rolled down the hill (during the winter) and is in the middle of a cottage road. Three strong young people try to push it out of the way. One pushes 220 N [E], another pushes 300 N [S] and the third pushes 270 N [S 20 E].

Draw a FBD and calculate Fnet. **{ Fnet = 636 N [E 61° S] }**

4. What is the magnitude of the gravitational force between a 55 kg student and a 65 kg student whose centres are 1.0 m apart?

{ Fg = 2.4×10^{-7} N [towards each other] }

5. A) What is the weight of a 19 kg curling stone on earth?

{ Weight = Fg = 190 N [down] – rounded to 2 digits }

B) What is the weight of a 54 kg robot on the surface of Venus where the gravitational intensity (g) is 8.9 N/kg [down]

{ Weight = Fg = 480 N [down] – rounded to 2 digits }

6. The force of gravity between a concrete ball and a steel ball is 1.7×10^{-4} N. What would it be if

a) the mass of the concrete ball was tripled?

{ 3 Fg = 3 x 1.7 x 10^{-4} N = 5.1 x 10^{-4} N }

b) the mass of the concrete ball was tripled and steel ball quadrupled?

{ 12 Fg = 12 x 1.7 x 10^{-4} N = 2.04 x 10^{-3} N }

c) the masses stayed the same but the distance was tripled

{ 1/9 Fg = 1/9 x 1.7 x 10^{-4} N = 1.9 x 10^{-5} N }