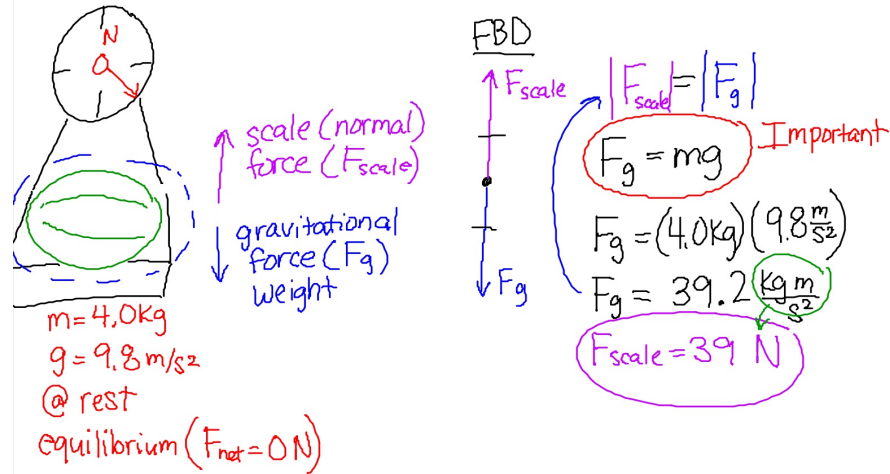


15. You place a watermelon on a spring scale at the supermarket. If the mass of the watermelon is 4.0 kg, what is the reading on the scale?



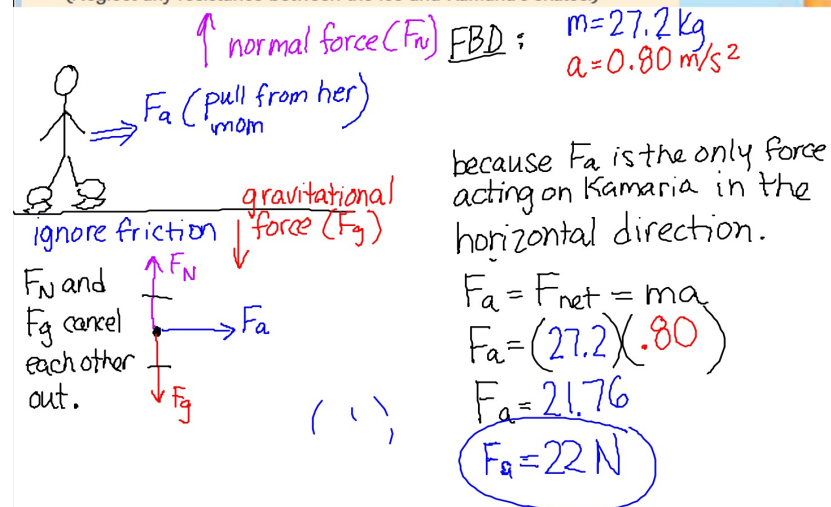
$m = 4.0 \text{ kg}$
 $g = 9.8 \text{ m/s}^2$
 @ rest
 equilibrium ($F_{\text{net}} = 0 \text{ N}$)

scale (normal) force (F_{scale})
 gravitational force (F_g)
 weight

FBD
 $F_{\text{scale}} = |F_g|$
 $F_g = mg$ Important
 $F_g = (4.0 \text{ kg})(9.8 \frac{\text{m}}{\text{s}^2})$
 $F_g = 39.2 \frac{\text{kg} \cdot \text{m}}{\text{s}^2}$
 $F_{\text{scale}} = 39 \text{ N}$

Page 1

16. Kamaria is learning how to ice-skate. She wants her mother to pull her along so that she has an acceleration of 0.80 m/s^2 . If Kamaria's mass is 27.2 kg, with what force does her mother need to pull her? (Neglect any resistance between the ice and Kamaria's skates.)



$m = 27.2 \text{ kg}$
 $a = 0.80 \text{ m/s}^2$

normal force (F_N)
 F_a (pull from her) mom
 ignore friction
 gravitational force (F_g)

F_N and F_g cancel each other out.

because F_a is the only force acting on Kamaria in the horizontal direction.
 $F_a = F_{\text{net}} = ma$
 $F_a = (27.2)(.80)$
 $F_a = 21.76$
 $F_a = 22 \text{ N}$

Page 2

17. Taru and Reiko simultaneously grab a 0.75-kg piece of rope and begin tugging on it in opposite directions. If Taru pulls with a force of 16.0 N and the rope accelerates away from her at 1.25 m/s², with what force is Reiko pulling?



$R \leftarrow \Rightarrow T$

$F_{\text{net}} = \sum F = F_T - F_R$

$ma = F_T - F_R$

$(.75)(-1.25) = (16\text{N}) - F_R$

$-0.9375 = 16\text{N} - F_R$

$-16\text{N} -16\text{N}$

$-16.9375\text{N} = -F_R$

$F_R = 17\text{N}$

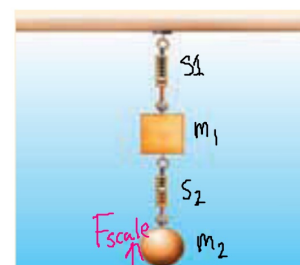
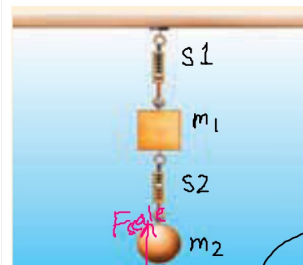
$F_{\text{net}} = ma$
 $m = .75\text{kg}$
 $a = -1.25\text{m/s}^2$
 $F_T = 16\text{N}$

accelerating away from Taru
 F_{net}

Page 3

18. In Figure 4-8, the block has a mass of 1.2 kg and the sphere has a mass of 3.0 kg. What are the readings on the two scales? (Neglect the masses of the scales.)

Figure 4-8



FBD (S1)

$F_{\text{net}} = m_1g + m_2g$
 $(m_1 + m_2)g$
 $(1.2 + 3.0)(9.8)$

$F_{\text{scale}} = 41\text{N}$

FBD (S2)

$F_{\text{net}} = m_2g$
 $= (3)(9.8)$
 $= 29.4\text{N}$

29N

Page 4