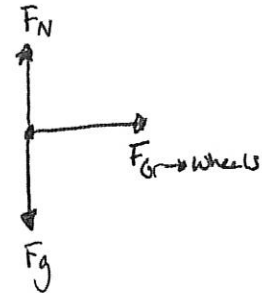
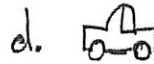
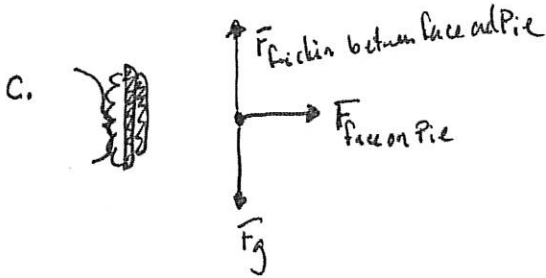
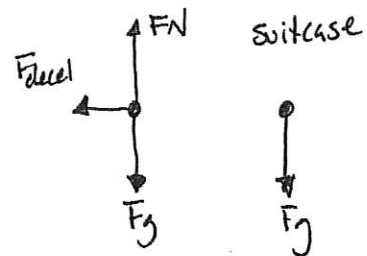
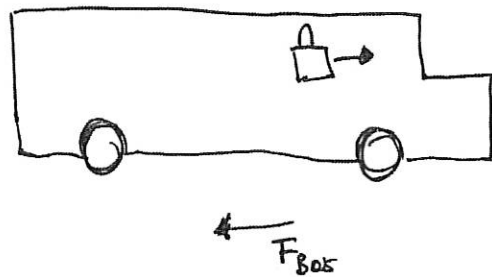


...  
Problem Set #2



e. your choice!

2. Before the bus stops the suitcase is travelling along with the rest of the bus, forward down the road. When the bus driver slams on the brakes the bus and everything attached to the decelerates rapidly in the opposite direction (backwards). The suitcase, presumably, is not attached to the bus therefore it does not experience the force that slows the bus and everything else down. Therefore the suitcase continues traveling forward until it hits the front of the bus. Since the passenger was at the back of the bus the suitcase could not have hit him due to the brakes being slammed.



3. Rockets move forward due to the principles defined in Newton's third law. The rocket accelerates propellant (usually in the form of MANY molecules and atoms) behind it. The molecules are very small, but there are so many of them and their acceleration is so high that it creates a reaction force in the opposite direction on the rocket, pushing the rocket forward.

4. a.  $F = ma$  mass stays the same, Force tripled  $\rightarrow$  acceleration triples

$$3 \cdot F = m (3 \cdot a)$$

$$a = 12 \text{ m/s}^2$$

$$3 \cdot 12 = 36 \text{ m/s}^2$$

b.  $F = ma$   $a = 18 \text{ m/s}^2$ , mass doubles, Force stays the same

$$F = 2 \cdot m \cdot a = m \cdot 18 \quad \leftarrow \text{previous force}$$

$$2a = 18$$

$$a = 9 \text{ m/s}^2$$

c.  $F = ma$ ,  $a = 6 \text{ m/s}^2$ ,  $F_{\text{new}} = F/3$ , mass stays the same

$$\frac{F}{3} = m \frac{a}{3} \quad a_{\text{new}} = \frac{a}{3} = \frac{6}{3} \Rightarrow 2 \text{ m/s}^2$$

5. See notes from 9/16