

# Chapter 07

1a  $m_1 = m_2 = m_3 = m$

$\vec{F}_N = ?$   $\vec{F}_g = ?$

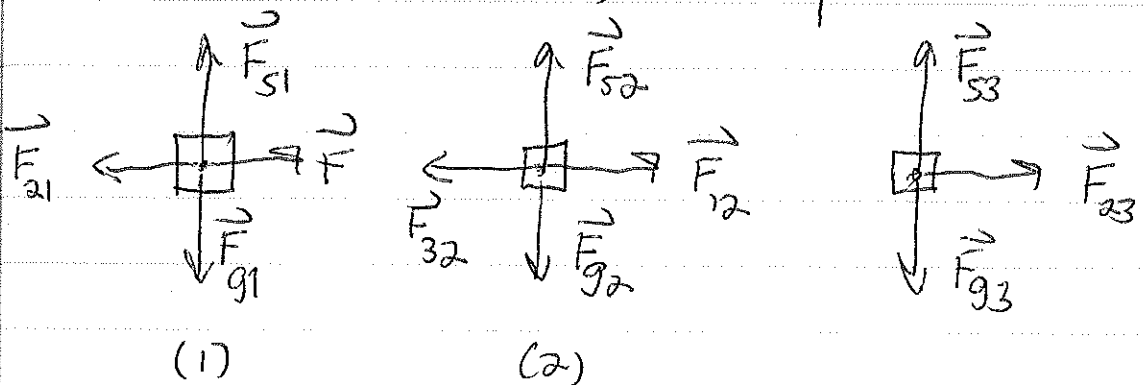
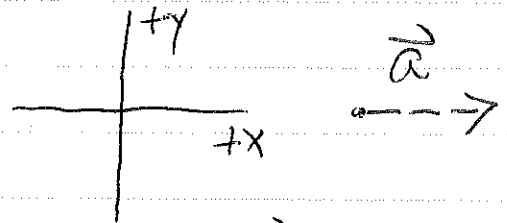
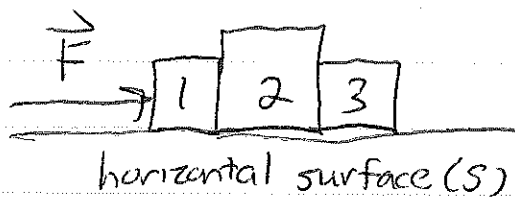
1b 2-D motion. Ignore the 3rd dimension.

Treat the blocks are particles.

Ignore air resistance.

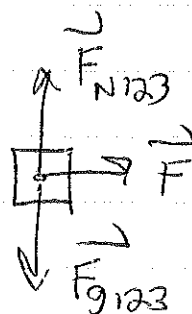
Newton's laws of motion, mass vs. weight.

2a



2b  $\Sigma \vec{F} = m\vec{a}$   $F_g = mg$

3a System: All three blocks



$\Sigma \vec{F}_x = m\vec{a}_x$

$F = (3m)(a)$   $a = \frac{F}{3m}$

3a (cont.)

System: Block 1  $F_{s1} = F_{g1} = mg$

$$F - F_{21} = m_1 a = m \left( \frac{F}{3m} \right) = \frac{F}{3} \quad F_{21} = \frac{2F}{3}$$

System: Block 2  $F_{s2} = F_{g2} = mg$

$$F_{12} - F_{32} = m_2 a = m \left( \frac{F}{3m} \right) = \frac{F}{3}$$

$$F_{32} = F_{12} - \frac{F}{3} = \frac{2F}{3} - \frac{F}{3} = \frac{F}{3}$$

System: Block 3  $F_{s3} = F_{g3} = mg$

$$F = m_3 a = m \left( \frac{F}{3m} \right) = \frac{F}{3}$$

4a All magnitudes have the correct units (Newtons).

All horizontal forces normal are the same ( $F/3$ ).

All vertical forces normal are the same ( $mg$ ). These answers all make sense.