p. 231 # 1, 2 ; p. 232 # 6, 7, 8

1. $m_1 = 1350 kg$
$\vec{V}_1 = 72 km/h [S]$
$m_2 = 1650 kg$
$V_2 = ?$

$m' = 1650 kg + 1350 kg$
$= 3000 kg$
$V' = 24 km/h [S]$

$$\vec{p}' = m'\vec{v}'$$
$$= (3000kg)(24 km/h [S])$$
$$= 72000 kgkm/h [S]$$

$$\vec{p} = \vec{p}' = m_1\vec{V}_1 + m_2\vec{V}_2$$

$$\therefore \quad \vec{V}_2 = \frac{\vec{p}' - m_1\vec{v}'}{m_2}$$

$$= \frac{(72000) - (1350kg)(72)}{(1650)}$$

$$= -15 km/h [S]$$
$$= 15 km/h [N]$$

2. $m_1 = 28g = 0.028 kg$
$v_1 = 92 m/s [F]$
$v_2 = 0.039 m/s [B]$
$m_2 = ?$

$$\vec{p} = 0$$
$$\therefore \quad m_1 v_1 = m_2 v_2$$
$$\therefore \quad m_2 = \frac{m_1 v_1}{v_2}$$

$$= \frac{(0.028 g)(92 m/s)}{0.039 m/s}$$

$$= 66 kg$$

p.231 # 1,2; p.232 # 6,7,8

6. $m \quad 3v \rightarrow p = 3mv$
$3m \quad v \rightarrow p = 3mv$

Both have equal momentums, ∴ when they collide, they will have the same momentum

7. $m_1 = 2.5\ kg$
$m_2 = 7.5\ kg$
$v_1 = 6.0\ m/s$
$v_2 = -15\ m/s$

$m' = m_1 + m_2$
$= 10.0\ kg$
$v' = ?$

$p_{TOTAL} = m_1 v_1 + m_2 v_2$
$= (2.5\ kg)(6.0\ m/s) + (7.5\ kg)(-15\ m/s)$
$= -97.5\ kg\,m/s$

$p_{TOTAL} = p'_{TOTAL} = m'v' \Rightarrow v' = \frac{p_{TOTAL}}{m'}$

$v' = \frac{-97.5\ kg\,m/s}{10.0\ kg}$

$v' = -9.75\ m/s$
$= -9.8\ m/s$

8. Her initial $p = 0$. ∴ after a collision, her $p = 0$.
If she throws her tool bag away from the space station, by conservation of momentum, she will move towards the space station.