

Early Chapter 3 Solutions

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In response to a couple of questions, here are solutions to E3-8 and P3-8.

E3-8

$$a = F/m = \frac{29 \text{ N}}{930 \text{ kg}} = 3.1 \times 10^{-2} \text{ m/s}^2$$

$$x = v_0 t + \frac{1}{2} a t^2 = 0 + \frac{1}{2} (3.1 \times 10^{-2} \text{ m/s}^2) (86400 \text{ s})^2 = 1.2 \times 10^8 \text{ m}$$

$$v = v_0 + a t = 0 + (3.1 \times 10^{-2} \text{ m/s}^2) (1.2 \times 10^8 \text{ m}) = 2700 \text{ m/s}$$

P3-8

$$F = ma = \frac{45.2 \text{ kg} + 22.8 \text{ kg} + 34.3 \text{ kg}}{1.32 \text{ m/s}^2} = 135 \text{ N}$$

Consider the third mass, m_3

$$F = ma = 34.3 \text{ kg} \times 1.32 \text{ m/s}^2 = 45.3 \text{ N}$$

To get the force exerted on m_2 , we use the calculated acceleration, and the masses m_2 and m_3 . Drawing the force diagram for the action-reaction forces between pairs of masses will convince you that this is true.

$$F = ma = \frac{22.8 \text{ kg} + 34.3 \text{ kg}}{1.32 \text{ m/s}^2} = 75.4 \text{ N}$$