Homework Set #2 Solutions (9/8-12)

Chapter 3: **Questions** 18, 40, 59 **Exercises** 12, 20, 24

Questions:

18. Yes, the net force resulting from these two forces can have any value between zero and 1400 newtons.

40. The acceleration of both objects is zero, so the net forces must be zero.

59. The forces act on different objects. The frictional force of the ground on the horse's hoofs allows the horse to move the cart.

Exercises:

12. $F_{net} = ma = (1200kg)(4m/s^2) = 4800N$

20. $F_{net} = ma = (10kg)(3m/s^2) = 30N$
        Therefore, $F_{app} = F_{net} + F_{frict} = 30N + 50N = 80N$

24.
        $F_{net} = ma = (25kg)(2m/s^2) = 50N$

        $F_{mother,daughter} = F_{daughter,mother} = 50N$ by the 3rd law

        $a_{mother} = \dfrac{50N}{50kg} = 1m/s^2$

Chapter 4: **Questions** 2, 6 **Exercises** 1, 6
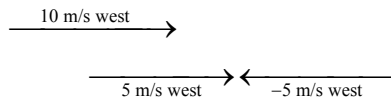
Questions:

2. The car would travel in the direction of its velocity because there would be no net force acting on it.

6. a) The velocity is tangent to the path. b-d) The change in velocity, the acceleration and the net force all point radially inward.
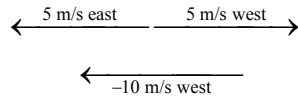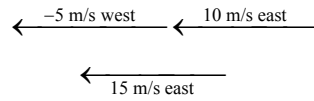
Exercises:

1.

a) 5 m/s west

$\xrightarrow{\text{10 m/s west}}$

$\xrightarrow{\text{5 m/s west}}$ $\xleftarrow{\text{−5 m/s west}}$

b) 5 m/s east

$\xleftarrow{\text{5 m/s east}}$ $\xrightarrow{\text{5 m/s west}}$

$\xleftarrow{\text{−10 m/s west}}$

c) 15 m/s east

$\xleftarrow{\text{−5 m/s west}}$ $\xleftarrow{\text{10 m/s east}}$

$\xleftarrow{\text{15 m/s east}}$

6.

$$\bar{a} = \frac{\Delta v}{\Delta t} = \frac{(12 \text{ m/s}) - (-8 \text{ m/s})}{.5 \text{ s}} = 40 \text{ m/s}^2 \text{ (west)}$$

$\xleftarrow{\text{−8 m/s east}}$ $\xleftarrow{\text{12 m/s west}}$

$\xleftarrow{\text{20 m/s east}}$