Chapter 8

1. B 2. A 3. C 4. A 6. B 7. A 8. A

9. B $\Delta p = F\Delta t$
same force, but longer time results in larger change in momentum.

10. A

11. A $F\Delta t = \Delta p$
$$F = \frac{\Delta p}{\Delta t} = \frac{17}{5} = 3.4\,N$$

12. A (momentum is conserved when there are no net external forces.)

13. C no external forces, so momentum is conserved.
$p_1 + p_2 = p_1' + p_2'$
p_1 must be greater than p_2'

14. C Since there is friction, momentum is not conserved. There must be a loss of total momentum due to friction

15. A momentum is conserved. m_p = mass person, m_o = mass object
$m_p v_p + m_o v_o = m_p v_p' + m_o v_o' = 0$
$m_p v_p' = m_o v_o'$
since m_p is same for both, if mass of object is greater, the momentum will be greater and therefore velocity will be greater.

16. A $F\Delta t = \Delta p = m\Delta v$

$$m = \frac{F\Delta t}{\Delta v} = \frac{50(.2)}{10} = 1 \text{ kg}$$

17. C $F\Delta t = \Delta p = m\Delta v$

$$\Delta t = \frac{m\Delta v}{F} = \frac{(50)(60-20)}{130}$$

$$\Delta t = 15.38$$

18. A $m_m v_m + m_b v_b = m_m v_m' + m_b v_b' = 0$

$$-m_m v_m' = m_b v_b'$$

$$v_m' = \frac{-m_b v_b'}{m_m} = \frac{5(50)}{70} = -3.6 \text{ m/s}$$

19. C $m_g v_g + m_p v_p = m_{g+p} v_{g+p}$

$$v_{g+p} = \frac{m_p v_p}{m_{g+p}} = \frac{(.15)(50)}{(65+.15)} = 0.12 \text{ m/s}$$

(recoil will be in the same direction as the puck)

21. B 22. C 23. C

24. A $F\Delta t = \Delta p$

$$\Delta t = \frac{\Delta p}{F} = \frac{12}{50} = .24 \text{ s}$$

26. B (isolated system = no external forces)
Note: we are assuming no friction

27. A 29. B

30. A Total momentum before collision is zero since vehicles have same mass but opposite directions. Total momentum after collision is zero as well.

31. B 32. B 33. C 34. A 35. A 36. D

40. A 41. C 44. C 45. A 46. D 48. B