1. Displacement is equal but astronauts travel greater distance
2. a. diagram
   b. 10.0 yds, 270.0°
   c. 42.4 yds
   d. 50.0 yds, 90.0° from S. goal
3. a. 9.47×10^{15} m
   b. 1.28 s
   c. 99 days
4. a. 57 miles, 270°
   b. 110 mph, 270°
   c. 2<u>0</u> miles, 90° from airport
5. 11 m
6. 300 km/h (190 mph!)
7. a. 5.0 m
   b. 3.4 m west of the flower
   c. $t = 10.7$ s and $t = 25$ s
   d. 0.20 m/s, west
   e. 0.47 m/s
   f. 1.0 m/s, west
   g. 0.30 m/s, west
   h. at 5.0 m east of the flower
      and at 3.4 m west of the flower
   i. 1.0 m/s
8. a. 6.5 s < t < 13.7 s, 15.5 s < t < 25.0 s
   b. 4.0 s < t < 6.5 s, 13.7 s < t < 15.5 s
   c. 13.7 s < t < 14.7 s
9. a. yes – object reversing direction
   b. yes – object on curved path
   c. no – if speed changes so does velocity
   d. yes – cruising at constant velocity
   e. yes – object's speed is decreasing
10. a. 0.36 m/s^2
    b. 3.0 s
11. a. 470 m/s
    b. Mach 1.4
12. 25.2 g
13. 7.0×10^4 m/s, 18<u>0</u>°
14. a. 0 s < t < 26 s
    b. 30 m/s
    c. 2.2 m/s^2, 90°
    d. 2.5 m/s^2, 270°, speed increasing
    e. 5.0 m/s^2, 90°
    f. 12 s < t < 20 s, 27 s < t < 32 s
       38 s < t < 50 s
    g. 20 s < t < 26 s, 32s < t < 38 s
15. a. 180 m, S
    b. 63 m, S
    c. 550 m
16. a. 11.7 m down from the top
    b. 7.80 m/s
    c. 3.92 s
17. a. 45 m
    b. 180 m
18. 36.1 m/s
19. a. 0.0 m, 24.0 m, 0.0 m
    b. 12.0 m/s, 0.0 m/s, 12.0 m/s
    c. slows, reverses direction, speeds up
20. a. 6.00 m
    b. 3.00 m/s^2, 195.0°
    c. 3.00 m/s
    d. 7.50 m
    e. 4.50 m, 15.0° from initial pt.
21. a. 920 m, 90°
    b. 920 m, 90°
22. 45<u>0</u> km/s^2
23. a. 3<u>0</u> m/s
    b. 6.0 m/s^2
24. a. 150 m
    b. 30.0 m/s
25. 1.6 m
26. 280 m/s^2 (28 g)
27. a. yes – car needs 50.0 m to stop!
    b. 22 m/s
28. The more dense, streamlined, and slow speed, the more accurate is g.
29. Thrown rock has greater speed less time. Both rocks have same acceleration.
30. a. 38.4 m
    b. 27.4 m/s, 270.0°
31. a. 19.8 m/s
    b. 28.0 m/s
32. a. 11.5 m
    b. 1.53 s, 1.53 s
    c. 15.0 m/s, 270.0°
33. a. 19.6 m
    b. 43.8 mph, 90.0°
34. 1.5 s
35. a. 1.44 s
    b. 8.09 m/s
36. a.1<u>0</u> m (23rd floor)
    b. 42 m/s
37. a. 13.6 m/s
    b. 11.0 m
    c. 9.38 m
38. a. 4.85 m/s, down
    b. 4.43 m/s, up
    c. 930 m/s^2, up (95 g)
39.
40.