1. A car accelerates from 15 m/s [E] to 25 m/s [W] in 26 seconds.
    a. Calculate the acceleration of the car. { $\vec{a}$ = -1.54 m/s^2}
    b. Calculate the displacement of the car during the above acceleration. {$\vec{d}_f$ = 130 m}
    c. Calculate the velocity of the car if it continues to accelerate for an additional 15 seconds. {$\vec{v}_f$ = 48.0 m/s^2}

2. A ball is kicked 20 m [E], 35 m [W], 50 m [E], and finally 10 m [W]. If all of this takes place in 52 seconds calculate:
    a. the average speed of the ball. {v_{sp} = 2.2 m/s}
    b. the average velocity of the ball. {$\vec{v}_{avg}$ = 0.48 m/s}

3. A person is standing atop a cliff that is 112 m high cliff overlooking the water below. Not happy with the new iPhone 5S she drops the phone. Hints: use the acceleration of gravity for the Earth; and when an object is dropped the initial velocity is zero.
    a. Calculate the time it takes for the iPhone to hit the water below. {t = 7.1 s}
    b. Calculate the velocity as it enters the water. {$\vec{v}_f$ = -70.0 m/s}
    c. Calculate the velocity of the iPhone 75 m above the water. {$\vec{v}_f$ = -58.6 m/s}

4. Standing on the ground a person throws a spear. It leaves his hand with an upward velocity of 21 m/s.
    a. Calculate the length of time the spear will be traveling upwards. {t = 2.1 s}
    b. Calculate the spear's maximum height. {$\vec{d}_f$ = 22.5 m}
    c. Calculate the velocity of the spear when it is 15 m above the ground. {$\vec{v}_f = \pm$12.1 m/s}

5. A plane changes its velocity from 215 m/s [S] to 300 m/s [N]. The acceleration was 5.72 m/s^2.
    a. Calculate the time it took for the plane to change its velocity. {t = 90.0 s}
    b. Calculate the displacement of the plane in that time. {$\vec{d}_f$ = 3830 m}
    c. Calculate the distance the plane traveled in that time. Hint: find the distance the plane traveled in both the South and Northern directions. {d = 11 900 m}

6. A fighter jet initially flying 250 m/s [E] turns to fly a supersonic 400 m/s [W]. This happens in 12 seconds.
    a. Calculate the acceleration of the plane. {$\vec{a}$ = -54.2 m/s^2}
    b. Calculate the displacement of the plane in that time. {$\vec{d}_f$ = 900 m}
    c. Calculate the distance traveled by the plane in that time. {d = 2050 m}

7. A cannonball is fired from a 250 m high cliff towards a galleon. Its vertical, upward, velocity is 75 m/s.
    a. Calculate the maximum height above the water the cannonball reaches. {$\vec{d}_f$ = 536 m}
    b. Calculate the vertical velocity with which the cannonball strikes the galleon. {$\vec{v}_f$ = -103 m/s}
    c. Calculate the length of time the cannonball takes to travel from the cannon to the galleon. {t = 18.1 s}

8. A car is driving around a circular track. The track has a radius of 100 m. Starting from rest it accelerates to 30 m/s in 12 seconds then holds a constant speed of 30 m/s.
    a. Calculate the distance moved along the track during the acceleration. {d = 180 m}
    b. Calculate the average speed and velocity when the car is half way around the track. {v_{sp} = 19.0 m/s; $\vec{v}_{avg}$ = 12.1 m/s}
    c. Calculate the average speed and velocity when the car has returned to its starting position. { v_{sp} = 23.3 m/s; $\vec{v}_{avg}$ = 0.0 m/s }
    d. **Challenge**: Calculate the average velocity during the car's first 12 and 20 seconds of motion. {$\vec{v}_{avg}$ = 6.5 m/s; $\vec{v}_{avg}$ = 4.3 m/s }