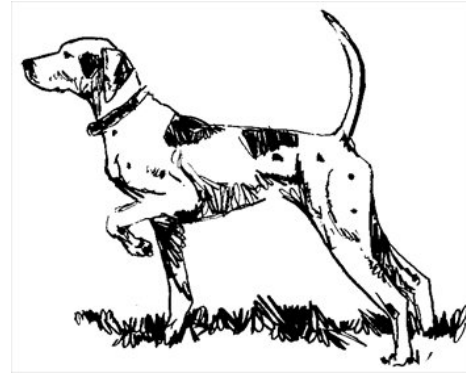# Motion: review

Pretend this is a test. Answer each question as best you can. You will get one point for the setup, the equation and the answer. Don't forget to include the units in your final answer.

1. A person walks the length of a soccer field (110 meters) in 40 seconds? What is the average speed this person walks?

2. All objects accelerate at _____ m/s^2 because of gravity.

3. The velocity of an object at rest is _____ m/s.

4. Draw a graph that best shows the motion of a person walking at a constant speed?

5. Draw a graph that best shows the motion of a person accelerating from rest?

6. A rock is dropped from rest from a height 15.0 meters above the ground. The rock falls freely. What is the final speed of the rock as it hits the ground?

7. A dog is running at 4 m/s and sees a **squirrel!** The dog speeds up to 8 m/s in only 2 seconds at a constant acceleration. Find the distance the dog ran in those 2 seconds.

8. You are driving along the street at the speed limit (35 mph) and 50 meters before reaching a traffic light you notice it becoming yellow. You accelerate to make the traffic light within the 3 seconds it takes for it to turn red. What is your speed as you cross the intersection? Assume that the acceleration is constant.

9. How high can someone throw a ball if they can throw it with initial velocity 90 mph?

10. A speedboat increases its speed uniformly from 20 m/s to 30 m/s in a distance of 200m. Find
    (a) the magnitude of its acceleration and
    (b) the time it takes the boat to travel the 200-m distance.

11. A car drives straight off the edge of a cliff that is 57 m high. The investigator at the scene of the accident notes that the point of impact is 130 m from the base of the cliff. How fast was the car traveling when it went over the cliff?

12. A ball is thrown vertically upward with a speed of 25.0m/s.
    (a) How high does it rise?
    (b) How long does it take to reach its highest point?
    (c) How long does the ball take to return to the ground after it reaches its highest point?
    (d) What is its velocity when it returns to the ground?

13. A tortoise and a hare are in a road race to defend the honor of their breed. The tortoise crawls the entire 1000 meters at a speed of 0.2 m/s. The rabbit runs the first 200 meters at 2 m/s, stops to take a nap for 1.3 hours, and awakens to finish the last 800 meters with an average speed of 3 m/s. Who wins the race and by how much time?

14. A missile is launched into the air at an initial velocity of 80 m/s. It is moving with constant velocity until it reaches 1000m, when the engine fails.
    (a) How long does it take it to reach 1000m?
    (b) How high does the missile go?
    (c) How long does it take for it to fall back to the earth?
    (d) How long does it stay in the air?
    (e) How fast is it going when it hits the ground?

15. The slowest animal ever discovered is a crab found in the Red Sea that travels an average speed of 5.7 km/year. How long will it take this crab to travel 1 meter?