

## Section 3.4 Review Problems

### Formulas

Displacement =

Average Velocity =

Velocity =

Speed =

Moving right / forward:

Moving left / down:

Acceleration =

Speeding up:

Slowing down:

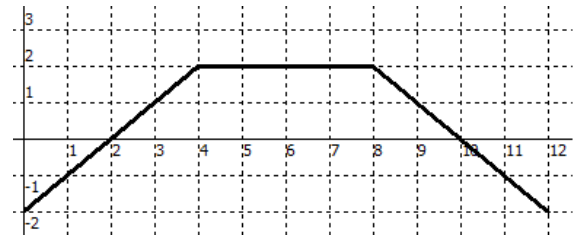
***Complete this worksheet on  
a separate sheet of paper.***

1. The *position* of a particle that moves along a line is given by  $s(t) = t^2 - 4t + 3$  for any time  $t \geq 0$ .
  - a. Find the displacement of the particle for the first 5 seconds.
  - b. Find the average velocity of the particle for the first 5 seconds.
  - c. Find the velocity of the particle at 5 seconds.
  - d. Is the particle moving forward or backwards at 5 seconds? Explain.
  - e. Is the particle speeding up or slowing down at 5 seconds? Explain.
  - f. Find the acceleration of the particle at any time  $t$ .
  - g. When does the object change directions?
  
2. The *position* of a particle that moves along a line is given by  $s(t) = t^2 - 11t - 12$  for any time  $t \geq 0$ .
  - a. Find the displacement of the particle for the first 2 seconds.
  - b. Find the average velocity of the particle for the first 2 seconds.
  - c. Find the velocity of the particle at 2 seconds.
  - d. Is the particle moving forward or backwards at 2 seconds? Explain.
  - e. Is the particle speeding up or slowing down at 2 seconds? Explain.
  - f. Find the acceleration of the particle at any time  $t$ .
  - g. When does the object change directions?
  
3. An object is propelled upward with an initial velocity of 32 feet per second so that its *height* is given by  $h(t) = -.8t^2 + 32t$ . (calculator allowed)
  - a. Find the objects velocity and acceleration at any time  $t$ .
  - b. When did the object reach its maximum height?
  - c. What was the maximum height of the object?
  - d. When did the object reach half its maximum height?
  - e. When did the object hit the ground?

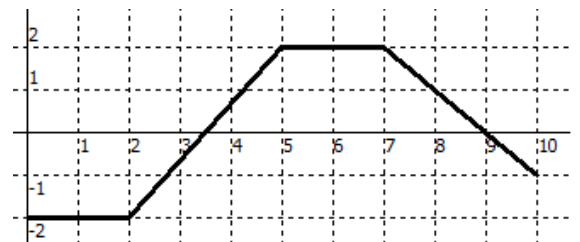
4. An object is propelled upward with an initial velocity of 16 feet per second so that its *height* is given by  $h(t) = -.8t^2 + 16t$ .
- Find the objects velocity and acceleration at any time  $t$ .
  - When did the object reach its maximum height?
  - What was the maximum height of the object?
  - When did the object reach half its maximum height?
  - When did the object hit the ground?

5. The number of *gallons* in a water tank in  $t$  minutes is given by  $V(t) = 300(25 - t)^2$ . The tank is being drained. How fast is the tank draining in **3 minutes?** **7 minutes?** When will the tank be **empty**?

6. The graph below shows the *velocity* of an object in ft/sec. Use the graph to answer the following?
- When does the object change directions?
  - Graph the acceleration of the object.
  - When does the object speed up/slow down?
  - When is the object moving at a constant speed?
  - When is the object moving forward/backward?
  - What is the velocity at  $t = 6$ ?
  - What is the acceleration at  $t = 6$ ?



7. The graph below shows the *velocity* of an object in ft/sec. Use the graph to answer the following?
- When does the object change directions?
  - Graph the acceleration of the object.
  - When does the object speed up/slow down?
  - When is the object moving at a constant speed?
  - When is the object moving forward/backward?
  - What is the velocity at  $t = 8$ ?
  - What is the acceleration at  $t = 8$ ?



8. The graph below shows the *velocity* of an object in ft/sec. Use the graph to answer the following?
- When does the object change directions?

