Calculus H   Name _____
Ch. 3 #9

1. What is the relationship between position, velocity, and acceleration?

2. Fill in the blanks.

a) When the _____ is positive, the object is moving in a positive direction.

b) An object is _____ when the velocity and acceleration have different signs.

c) An object is stopped when _____ is zero.

d) Speed is always positive because it is the _____ of velocity.

A particle moves along a horizontal line. Its position function is s(t) for t ≥ 0. Find the following:

3. If $s(t) = -t^4 + 15t^3$, find the velocity function v(t) and the acceleration function a(t).

4. If $s(t) = t^4 - 8t^3$, find the times t when the particle changes direction.

5. If $s(t) = t^2 - 4t - 96$, find the times t when the acceleration is 0.

6. If $s(t) = -t^2 + t + 72$, find the intervals of time when the particle is slowing down and speeding up.

7. If $s(t) = -t^3 + 10t^2$, find the position, velocity, speed, and acceleration at t = 7.

8. If $s(t) = -t^3 + 10t^2$ what is the distance traveled from t = 0 to t = 8?

9. If $s(t) = t^3 - 23t^2 + 120t$, find the intervals of time when the particle is slowing down and speeding up.

10. If $s(t) = -t^4 + 11t^3$, find the position, velocity, speed and acceleration at t = 4.