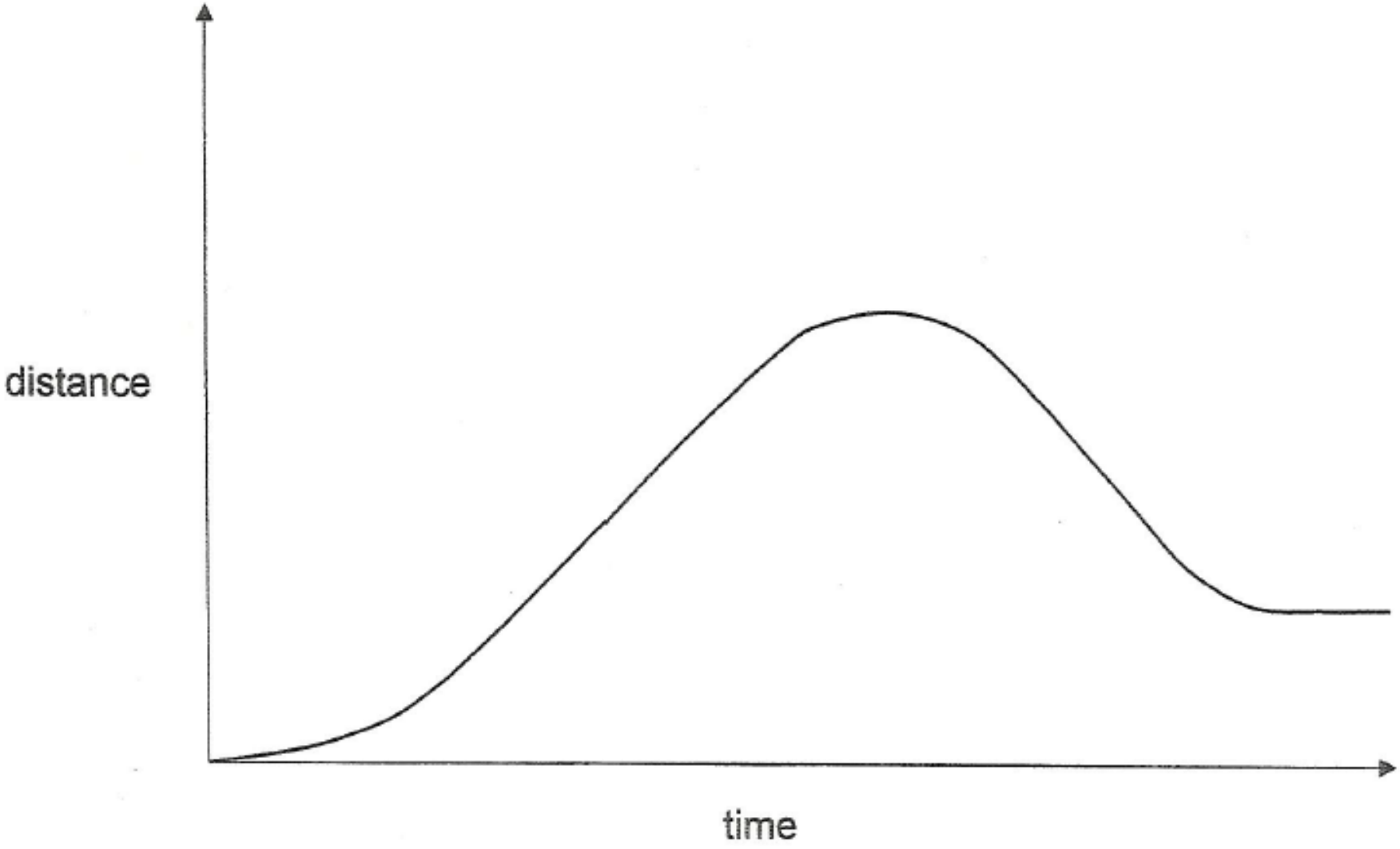
It is important to understand the relationship between a position graph, velocity and acceleration:

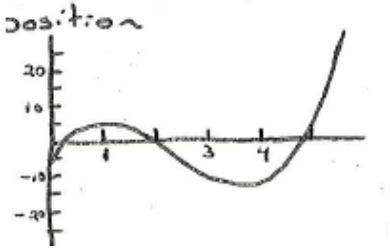


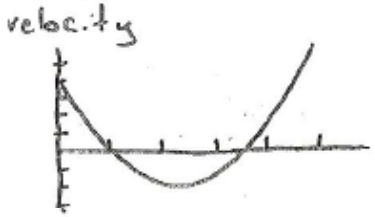
Motion along a line

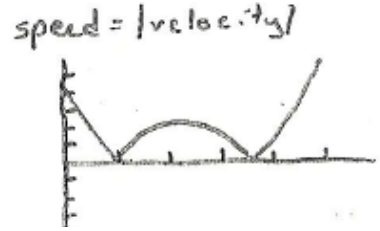
A particle is moving along the x-axis with the position

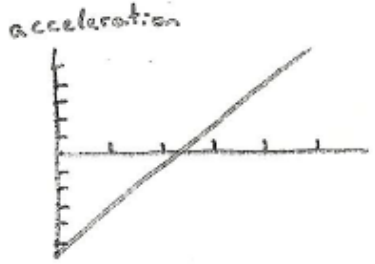
$$x(t) = 2t^3 - 14t^2 + 22t - 5, t \geq 0$$

Find the velocity and acceleration and describe the motion of the particle.









Page 158 Example 1

The position of a particle is given by the equation $s = f(x) = t^3 - 6t^2 + 9t$ where t is measured in seconds and s in meters.

a. Find the velocity at time t.

b. What is the velocity after 2 sec.? After 4 sec.?

c. When is the particle at rest?

d. When is the particle moving forward?

e. Draw a diagram to represent the motion of the particle.

f. Find the total distance traveled by the particle during the first five seconds.