



**Example 2:** Find an equation of the tangent line to  $f(x) = \ln(x + \ln x)$  at  $x = 1$ .

**Example 3:** Let  $f(x) = cx + \ln(\sin x)$ . For what value of  $c$  is  $f'(\pi/4) = 6$ ?

## 3-7 RATES OF CHANGE IN THE NATURAL AND SOCIAL SCIENCES [A START]

**Physics example:** A particle moves according to the law of motion  $s = f(t) = t^4 - 4t + 1$ , where  $t$  is measured in seconds and  $s$  is measured in meters.

(a) Find the velocity at time  $t$ . What is the velocity after 2 seconds?

(b) When is the particle at rest?

(c) When is the particle moving forward (in the positive direction)?

(d) Draw a diagram to illustrate the motion of the particle.

(e) Find the total distance traveled in the first 8 seconds.