Identify each problem as:

**Type I**: Given location, find slope, or

**Type II**: Given slope, find location.

Then solve each problem.

1. An object is launched upward from a tower so that after $t$ seconds its height above ground is $h(t) = 100 + 60t - 16t^2$ feet.
   
   (a) What is its velocity after 1 second?
   (b) What is its velocity after 3 seconds?
   (c) When is its velocity $-60$ ft/s?
   (d) What is its velocity at the time when it hits the ground?
   (e) How high is it when its velocity is $-68$ ft/s?

2. The graph of $f(x) = x^3 - x^2$ (shown at right) has two tangent lines with slope 1.
   
   (a) Find the equations of those lines.
   (b) Sketch them in the graph at right.
3. The graph of $f(x) = \frac{1}{x}$ has a tangent line that passes through $(0, 1.5)$ as shown at right.

(a) Where is the point of tangency?
(b) Find the equation of the tangent line at the point $(2, 0.5)$. Sketch this line in the graph at right.

Hints and Answers

1. a) (I) 28 ft/s; b) (I); c) (II) 3.75 s; d) (I) -100 ft/s; e) (II) 84 ft.
2. $y = x + 5/27; y = x - 1$.
3. a) (II) $x = 4/3$; b) (I) $y = -x/4 + 1$. 