

PRACTICE QUIZ 11 SOLUTIONS

ADRIAN PĂCURAR

Time: 10 min

Time to beat: 3 min

Problem 1. A ball is thrown in the air with a velocity of 37. Its height after t seconds is given by $h(t) = 37t - 16t^2$.

(a) Find the value of t when the ball attains its maximum height.

The height function is a parabola opening down which can be factored as $t(37 - 32t)$, and so the two roots (t values when height is zero) are $t = 0$ and $t = 37/32$. Since this is a parabola, the maximum height occurs at exactly the halfpoint between the two roots, which is $t = 37/64$.

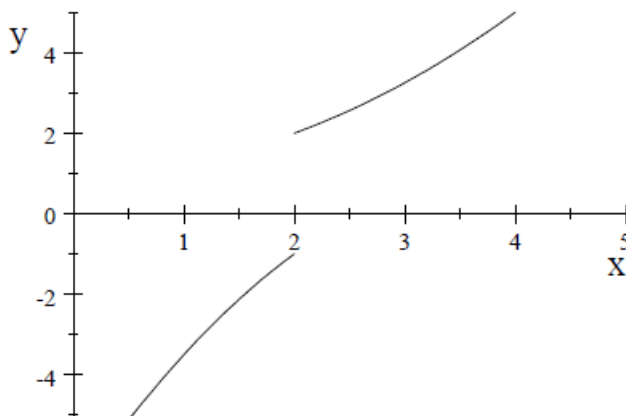
(b) What is the instantaneous velocity at the time you found in part (a)?

We don't need to plug anything in or take any derivative to determine this, as we know instantaneous velocity is the same as the slope of the tangent line. But h is maximum for $t = 37/64$, so we have a horizontal tangent of slope zero, which means the instantaneous velocity is zero.

Problem 2. Determine the limit $\lim_{x \rightarrow 36} \frac{\sqrt{x}-6}{x-36}$.

$$\lim_{x \rightarrow 36} \frac{\sqrt{x}-6}{(\sqrt{x}-6)(\sqrt{x}+6)} = \frac{1}{\sqrt{36}+6} = \frac{1}{12}$$

Problem 3. Consider the function f with the graph given below. Find the following limits



(a) $\lim_{x \rightarrow 2^-} f(x) = -1$

(b) $\lim_{x \rightarrow 2^+} f(x) = 2$

(c) $\lim_{x \rightarrow 2} f(x)$ does not exist as the one-sided limits are different.