

2.1 + 2.2 Worksheet

Instructions These exercises are meant to reinforce what you have learned as well as challenge you on concepts that you have a basic understanding of. You will almost certainly not finish these all during one recitation session. Try picking some of the more straightforward problems to get warmed up, and then try some others you are not sure how to solve. These are all possible exam problems! Your recitation instructor will send out the key later in the week.

1. If a ball is thrown into the air at a velocity of 40 ft/s, its height in feet t seconds later is given by $h(t) = 40t - 16t^2$.

(a) Find the average velocity for the time period beginning at $t = 2$ and lasting

i. 0.5 second

ii. 0.1 second

iii. 0.001 second

(b) What is the instantaneous velocity when $t = 2$ seconds?

2. Use a table of values to evaluate each limit

(a) $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$

(b) $\lim_{t \rightarrow 0} \frac{t - 9}{\sqrt{t} - 3}$

(c) $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 + x + 1}$

3. Sketch the graph of the function and use it to determine the values of a for which the limit $\lim_{x \rightarrow a} f(x)$ exists.

(a)

$$f(x) = \begin{cases} 1 + x, & x < -1 \\ x^2, & -1 \leq x < 1 \\ 2 - x & x \geq 1 \end{cases}$$

(b)

$$f(x) = \begin{cases} 1 + \sin x, & x < 0 \\ \cos x, & 0 \leq x < \pi \\ \sin x & x \geq \pi \end{cases}$$