1. (10pts) If an arrow is shot upward on the moon with a velocity of 58 m/s, its height in meters after \( t \) seconds is given by \( h = 58t - 0.83t^2 \). Find the average velocity over the time interval [2, 2.1].

2. (30pts) Find the following limits:
   a. \( \lim_{x \to 3} x^2 - x + 1 \)
   b. \( \lim_{t \to 1} \frac{x^2 + x - 2}{x^2 - 1} \)
   c. \( \lim_{t \to 0} \frac{\sqrt{1-t^2}}{t} \)
   d. \( \lim_{x \to -4} \frac{|x+4|}{x+4} \)
   e. \( \lim_{x \to -\infty} \frac{x^3 + x - 1}{x^2 + x - 1} \)
   f. \( \lim_{x \to -\infty} \sqrt{\frac{2x^2 - 1}{x + 8x^2}} \)

3. (20pts) Find the derivatives of the following functions:
   a. \( f(x) = x^2 - 8x + 6 \)
   b. \( f(x) = e^x - \sqrt{x} \)
   c. \( f(x) = \frac{1}{x^2 + x + 4} \)
   d. \( f(x) = e^x(e^x + x) \)

5. (10pts) Explain why \( f(x) \) defined below is discontinuous at \(-1\),

\[
   f(x) = \begin{cases} 
   \frac{x^2 - 1}{x + 1} & \text{if } x \neq -1 \\
   6 & \text{if } x = -1.
\end{cases}
\]

6. (10pts) Given \( f(x) = \sqrt{x} \), compute \( f'(4) \) using the definition

\[
f'(4) = \lim_{h \to 0} \frac{f(4 + h) - f(4)}{h}
\]

in section 2.8. Also find an equation of the tangent line to the graph of \( f \) at (4, 2).