Show all work for full credit. No calculators, notes or books are allowed.

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

   \[
   f(x) = \begin{cases} 
   5 + x, & \text{if } x < -2 \\
   x^2, & \text{if } -2 \leq x < 3 \\
   x + 1, & \text{if } x \geq 3 
   \end{cases}
   \]

2. Evaluate the following limits (if the limit does not exist, explain why).

   (a) \(\lim_{x \to 3} \left(10 + \frac{x}{5x}\right)\)

   (b) \(\lim_{x \to 2} \frac{x^2 - 5x + 6}{x - 2}\)

   (c) \(\lim_{h \to 0} \frac{(5+h)^2 - 25}{h}\)

   (d) \(\lim_{x \to 6} \frac{x^2 - 36}{\sqrt{x} - \sqrt{6}}\)

   (e) \(\lim_{x \to 1.5} \frac{2x^2 - 3x}{|2x - 3|}\)

   You could also look at Problems 11-30, Sec.2.3, page 112.

3. Explain why the function is discontinuous at 10, sketch the graph.

   \[
   f(x) = \begin{cases} 
   x, & \text{if } x < 10 \\
   e^x - 1, & \text{if } x \geq 10 
   \end{cases}
   \]

   You could also look at Problems 19,20, Sec.2.5, page 133.

4. By calculating an appropriate limit, find the slope of the tangent line to the graph of the function \(f(x) = \sqrt{2x + 1}\) at (4,3).

5. Problem 4, Sec. 2.5, page 133.

6. Problem 16, Sec. 2.7, page 156.

7. Problem 41, Sec. 2.6, page 134.