1. Find the slope of the secant lines of \( f(x) = 4x - 5x^2 \) on the intervals \([1, 1.5]\), \([1, 1.1]\), \([1, 1.01]\) and \([1, 1.001]\). From the results of the slopes you calculated what is your guess to the slope of the tangent line to \( f(x) \) at \( x = 1 \).

Solution: The secant line slopes are

\[
\frac{f(1.5) - f(1)}{1.5 - 1} = -8.5 \\
\frac{f(1.1) - f(1)}{1.1 - 1} = -6.5 \\
\frac{f(1.01) - f(1)}{1.01 - 1} = -6.05 \\
\frac{f(1.001) - f(1)}{1.001 - 1} = -6.005
\]

From the secant line slopes it appears that the slope of the tangent line to \( f(x) \) at \( x = 1 \) is \(-6\).

2. Sketch the graph of an example of a function \( f \) that satisfies all of the given conditions.

\[
\lim_{x \to 3^+} f(x) = 4 \quad \lim_{x \to 3^-} f(x) = 2 \quad \lim_{x \to -2} f(x) = 2 \quad f(3) = 3 \quad f(-2) = 1
\]

Solution: