

SECTION 2-5 EXAMPLES

1. Sketch the graph of a function with a removable discontinuity at $x = 2$, a jump discontinuity at $x = -2$ and that is continuous for all other real numbers.

2. Determine where the function $h(x) = \begin{cases} \sin x & x < \pi \\ 0 & x = \pi \\ x + 1 - \pi & \pi < x \end{cases}$ is not continuous and **justify** your answer. Sketch the graph of the function.

3. Use continuity to evaluate the limit $\lim_{x \rightarrow 10} \frac{x^2}{\sqrt{x-5}}$.

4. Determine the value of c that will make $f(x) = \begin{cases} c - x^2 & x \leq 1 \\ 5x - 2 & x > 1 \end{cases}$ continuous everywhere.

5. Use the Intermediate Value Theorem to show that there is a root of the equation $5 + 2x - x^4 = 0$ in the interval $(1, 2)$. To do so, explain how you are verifying that the hypotheses of the IVT hold, and then explaining what the IVT lets you conclude.