Math 2A Worksheet: 2.5 Continuity

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1. Find all values of x at which the following function is discontinuous.

$$f(x) = \begin{cases} 2^x & \text{if } x \leq 1 \\ 3 - x & \text{if } 1 < x \leq 4 \\ \sqrt{x} & \text{if } x > 4 \end{cases}$$

2. What value of c makes the below function continuous?

$$g(x) = \begin{cases} cx^2 + 2x & \text{if } x < 3 \\ x^3 + cx & \text{if } x \geq 3 \end{cases}$$

3. Suppose f and g are continuous functions such that $g(2) = 6$ and $\lim_{x\to 2}[3f(x) + f(x)g(x)] = 36$. Find $f(2)$.

4. Evaluate the limit $\lim_{x\to\pi} \sin(x + \sin x)$

5. Use the Intermediate Value Theorem to show that $\sin x = x^2 - x$ has a root in the interval $(1, 2)$.