

Each of the following has a removable discontinuity. Find a function, $g(x)$, that removes the discontinuity.

1. $f(x) = \frac{x^2 - 4}{x - 2}$	2. $f(x) = \frac{x^2 - 5x + 6}{x - 3}$
3. $f(x) = \frac{x^2 - 5}{x - \sqrt{5}}$	4. $f(x) = \frac{x^3 + 8}{x + 2}$

For problems 5-6,

- Determine the x -coordinate of the discontinuities on the graph of $f(x)$. Identify the discontinuities as either infinite or removable.
- Use limits to describe the behavior of $f(x)$ near any removable discontinuities.
- State the interval(s) on which $f(x)$ is continuous.
- Identify any vertical asymptotes on the graph of $f(x)$. Use limits to describe the behavior of $f(x)$ near the vertical asymptote.
- Use limits to identify any horizontal asymptotes on the graph of $f(x)$.

5. $f(x) = \frac{x^2 - 4}{x^2 + 3x + 2}$	6. $f(x) = \frac{2x^2 - 5x + 3}{x^2 + 6x - 7}$
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7. Sketch the graph of any function such that:

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$f(1) = 3$$

$$\lim_{x \rightarrow 1} f(x) = -2$$

$$\lim_{x \rightarrow \infty} f(x) = 5$$