

Name: _____
AP Calculus AB
Vertical Asymptotes WS

Directions: For each function, 1) determine the numbers at which $f(x)$ is discontinuous, 2) determine if $f(x)$ has any removable discontinuities, 3) find the vertical asymptotes, 4) determine the limits (one-sided limits and limits approaching from both directions) of $f(x)$ at a vertical asymptote.

$$1. f(x) = \frac{x^2 - x - 6}{x^2 - 4}$$

$$2. f(x) = \frac{x^2 - 10x + 21}{x^2 - x - 12}$$

$$3. f(x) = \frac{x^3 + x^2 - 16x - 16}{x^2 - 16}$$

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

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

$$6. f(x) = \frac{x^2 + 6x + 8}{x^2 - 6x + 8}$$

$$7. f(x) = \frac{x^2 + 3x - 28}{x^2 - 8x + 16}$$

$$8. f(x) = \frac{(3x - 6)\sqrt{x^2 + 1}}{5x - 10}$$

$$9. f(x) = \frac{x^2 - 3x - 10}{\sqrt{x + 2}}$$

$$10. f(x) = \frac{4 + x^2}{\sqrt{4 - x^2}}$$