

Study guide for additional concepts – Pre-calc/alg review

Factor out the lowest exponent and simplify:

$$x^{1/2} - x^{5/2}$$

$$x^{-1/2}(x + 3)^{1/2} + x^{1/2}(x + 3)^{-1/2}$$

$$x^{3/2} + 8x^{1/2} + 15x^{-1/2}$$

$$4(x + 1)^{1/2} - 5(x + 1)^{3/2} + (x + 1)^{5/2}$$

$$2x^{1/2} + 5x^{-1/2} + 2x^{-3/2}$$

$$(x + 2)^{7/2} - (x + 2)^{3/2}$$

$$(x^3 + 2)^{1/3} + (x^3 + 2)^{-5/3}$$

$$\frac{2x(4x + 7)^{1/3} - \frac{4}{3}x^2(4x + 7)^{-2/3}}{(4x + 7)^{2/3}}$$

For each function, find the equations of both the vertical asymptote(s) and horizontal asymptotes (if they exist)

$$1.) y = \frac{x}{x-3}$$

$$2.) y = \frac{x+4}{x^2+1}$$

$$3.) y = \frac{x^2-9}{x^3+3x^2-18x}$$

$$4.) y = \frac{2x^2+6x}{x^3-3x^2-4x}$$

$$5.) y = \frac{\sqrt{x}}{2x^2-10}$$

Find the oblique asymptote using long division. Also state any vertical asymptotes/holes.

$$f(x) = \frac{x^2 - 6x - 1}{x + 3}$$

$$f(x) = \frac{x^2 + 6x - 4}{3x - 6}$$

$$f(x) = \frac{x^3 - 5x}{x^2 + 1}$$

$$f(x) = \frac{x^2 + 2x - 12}{x - 5}$$

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