



## SECTION 5.3: RATIONAL FUNCTIONS

**Pr 1.** Compute each of the following:.

(a)  $\left(\frac{(x+2)^2}{x^2-9}\right)\left(\frac{5(x+3)}{(x-3)}\right)$

(b)  $\left(\frac{4x^3-12x^2+9x}{x^2-49}\right) \div \left(\frac{10x^2-15x}{x^2+4x-21}\right)$

(c)  $\frac{2}{(x-3)(x+6)} - \frac{x+6}{(x-3)(x+4)}$

**Pr 2.** State the domain of each rational function. Then classify each domain restriction as the location of a hole or vertical asymptote on the graph of the function.

(a)  $f(x) = \frac{(2x - 3)(4x + 7)}{(x - 8)(3x + 7)}$

Domain:

Vertical Asymptote(s):

Holes:

(b)  $h(x) = \frac{-3x}{9x^2 - 12x}$

Domain:

Vertical Asymptote(s):

Holes:

(c)  $j(x) = \frac{2x^2 - 4x + 2}{x^2 - 7}$

Domain:

Vertical Asymptote(s):

Holes:

**Pr 3.** Determine the  $x$ - and  $y$ -intercepts, if possible, for each function.

(a)  $f(x) = \frac{(2x - 3)(4x + 7)}{(x - 8)(3x + 7)}$

$x$ -intercept(s):

$y$ -intercept:

(b)  $h(x) = \frac{-3x}{9x^2 - 12x}$

$x$ -intercept(s):

$y$ -intercept:

(c)  $j(x) = \frac{2x^2 - 4x + 2}{x^2 - 7}$

$x$ -intercept(s):

$y$ -intercept:

**Pr 4.** Compute and simplify the difference quotient for each function.

(a)  $f(x) = -x^2 + 7x - 11$

(b)  $g(x) = \frac{6x}{8x + 1}$

SECTION 5.4: POWER AND RADICAL FUNCTIONS

**Pr 1.** Rewrite each radical in its equivalent exponent (power) form, assuming  $x$  is in the domain of each function.

(a)  $f(x) = \sqrt[9]{-3x^2 + 6x}$

(b)  $g(x) = 9\sqrt{2x^2 + 8x + 3}$

**Pr 2.** Rewrite each radical in its equivalent exponent (power) form, assuming  $x$  is in the domain of each function.

(a)  $f(x) = (-3x^2 + 6x)^{5/11}$

(b)  $h(x) = -4(8x + 3)^{7/2}$

**Pr 3.** State the domain of each function. Write your answer using interval notation.

(a)  $f(x) = \sqrt[4]{7x - 21}$

(b)  $h(y) = -2(3 - 8y)^{7/12}$

(c)  $j(x) = (3x + 5)^{-4/3}$

(d)  $k(x) = \frac{\sqrt{x+1}}{5\sqrt[3]{x-4}}$

**Pr 4.** State the domain of each function, using interval notation. Then determine the  $x$ - and  $y$ -intercepts, if possible, for each function.

(a)  $f(x) = 5\sqrt[7]{2x + 14}$

(b)  $g(x) = \sqrt[8]{1 - x}$

**Pr 5.** Rationalize each numerator or denominator, as appropriate, and simplify the expression.

(a)  $\frac{5x}{\sqrt{x} + 4}$

(b)  $\sqrt{2x + 3} - 4$

(c)  $\frac{\sqrt{x+h} - \sqrt{x}}{h}$



**Pr 6.** Compute the difference quotient for  $F(x) = -5\sqrt{3-x}$ .