

Math 114
Rational Expressions Review

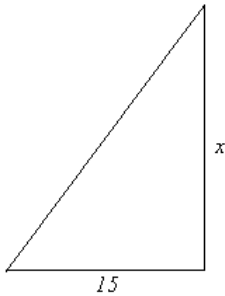
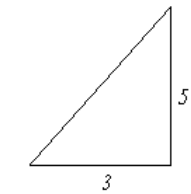
In addition to the questions below, review the material from the Rational Equations Applications handout

Solve.

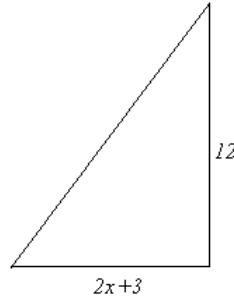
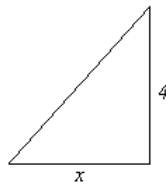
- [1] w varies directly as y and inversely as z .
 $w = 12$ when $y = 8$ and $z = 5$.
Find the value of w when $y = 6$ and $z = 15$.
- [2] b varies directly as the square root of c .
 $b = 12$ when $c = 16$.
Find the value of c when $b = 18$.
- [3] The height of a 1 liter water bottle varies inversely with the square of the radius of its base. A bottle with radius 5.4 cm is 11 cm tall. How tall is a bottle with radius 4.1 cm ?
- [4] The cost of insuring a delivery varies jointly with the number of items in the delivery and the value of each item. It costs \$15 to insure a delivery of 25 items each valued at \$20 dollars. How much does it cost to insure a delivery of 3 items each valued at \$80 ?

Solve for x in the following similar triangles.

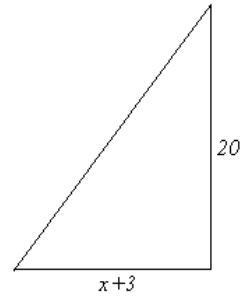
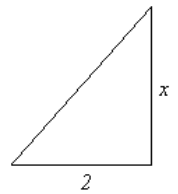
[5]



[6]



[7]



Simplify.

[8] $\frac{x^3 + 8x^2 - 48x}{3x^2 + 6x - 72}$

[9] $\frac{6x^2 - x - 1}{2x^2 + 9x - 5}$

[10] $\frac{\frac{3}{x-2} - 2}{\frac{4}{x-2} + 1}$

[11] $\frac{\frac{2}{x-3} - \frac{3}{x}}{\frac{5}{x-3} + \frac{2}{x}}$

[12] $\frac{\frac{1}{6x-12} - \frac{1}{4}}{3 - \frac{2}{x-2}}$

Perform the algebraic operations and simplify.

[13] $\frac{4x^2 - 1}{x^2 - 16} \cdot \frac{x^2 - 4x}{2x + 1}$

[14] $\frac{2x^2 - x - 6}{3x^2 + 4x + 1} \cdot \frac{3x^2 + 7x + 2}{2x^2 + 7x + 6}$

$$[15] \quad \frac{x^2 + 2x - 15}{x^2 + 3x - 10} \div \frac{x^2 - 9}{x^2 - 9x + 14}$$

$$[16] \quad \frac{9x^2 - 25}{2x - 2} \div \frac{6x - 10}{x^2 - 1}$$

$$[17] \quad \frac{x^2 - 5x}{2x - 8} + \frac{12 - 2x}{2x - 8}$$

$$[18] \quad \frac{2x^2 - x}{x^2 - 9} - \frac{x^2 + 12}{x^2 - 9}$$

$$[19] \quad \frac{x}{x + 2} + \frac{2}{x - 3}$$

$$[20] \quad \frac{x}{x + 2} - \frac{6}{x^2 + x - 2}$$

$$[21] \quad \frac{x + 1}{x^2 - 7x + 6} - \frac{x - 2}{x^2 - 4x - 12}$$

Solve for x.

$$[22] \quad \frac{x - 1}{3} = \frac{8}{x + 4}$$

$$[23] \quad \frac{3}{x} + \frac{10}{x^2} = 1$$

$$[24] \quad \frac{6}{x + 3} - \frac{2}{x + 2} = 1$$

$$[25] \quad \frac{4}{x^2 - 4} - \frac{2}{x^2 - 2x} = \frac{3}{x^2 + 2x}$$

[26] [a] Describe in words (not formulae) how to find the vertical and horizontal asymptotes of a rational function.

[b] Find the equations of the horizontal and vertical asymptotes of $y = \frac{7 - 9x}{12x + 8}$.

ANSWERS

$$[1] \quad w = 3$$

$$[2] \quad c = 36$$

$$[3] \quad 19.1 \text{ cm}$$

$$[4] \quad \$7.20$$

$$[5] \quad x = 25$$

$$[6] \quad x = 3$$

$$[7] \quad x = 5$$

$$[8] \quad \frac{x(x + 12)}{3(x + 6)}$$

$$[9] \quad \frac{3x + 1}{x + 5}$$

$$[10] \quad \frac{7 - 2x}{x + 2}$$

$$[11] \quad \frac{9 - x}{7x - 6}$$

$$[12] \quad -\frac{1}{12}$$

$$[13] \quad \frac{x(2x - 1)}{x + 4}$$

$$[14] \quad \frac{x - 2}{x + 1}$$

$$[15] \quad \frac{x - 7}{x + 3}$$

$$[16] \quad \frac{(3x + 5)(x + 1)}{4}$$

$$[17] \quad \frac{x - 3}{2}$$

$$[18] \quad \frac{x - 4}{x - 3}$$

$$[19] \quad \frac{x^2 - x + 4}{(x + 2)(x - 3)}$$

$$[20] \quad \frac{x - 3}{x - 1}$$

$$[21] \quad \frac{6x}{(x - 1)(x - 6)(x + 2)}$$

$$[22] \quad x = 4 \text{ or } x = -7$$

$$[23] \quad x = 5 \text{ or } x = -2$$

$$[24] \quad x = 0 \text{ or } x = -1$$

$$[25] \quad \text{no solution}$$

$$[26] \quad [a] \quad \text{refer to lecture notes}$$

$$[b] \quad \text{horizontal asymptote: } y = -\frac{3}{4}, \text{ vertical asymptote: } x = -\frac{2}{3}$$