

Math 114**Rational Expressions Review****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 ?
- [5] **DELETED**
- [6] **DELETED**
- [7] **DELETED**

Write equations for the following problems, then solve.

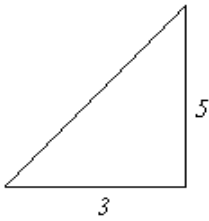
- [8] A number divided by twelve is equal to eight divided by three.
- [9] Five divided by four is equal to the sum of a number and seven divided by twelve.
- [10] A number divided by six is equal to the sum of that number and two divided by twelve.
- [11] A number divided by seven is equal to one divided by the sum of that number and six.

Write proportions for the following problems. YOU DO NOT NEED TO SOLVE THEM.

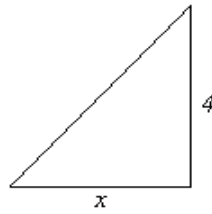
- [12] A car can travel 387 kilometers on 24 liters of gas.
How far can it travel on 17 liters of gas ?
- [13] A car can travel 185 kilometers on 13 liters of gas.
How many liters of gas does it need to travel 243 kilometers ?
- [14] On a blueprint, 3 centimeters represents 20 meters.
What length on the blueprint represents 37 meters ?
- [15] A music service charges \$17 for 19 downloads.
How many downloads can be purchased for \$68 ?

Solve for x in the following similar triangles.

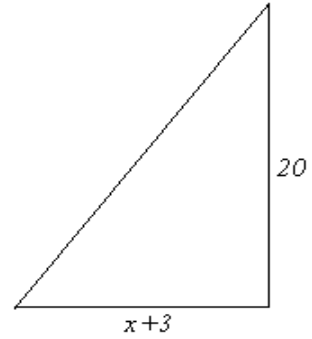
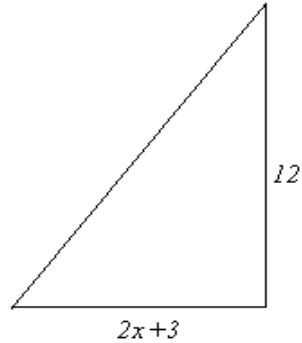
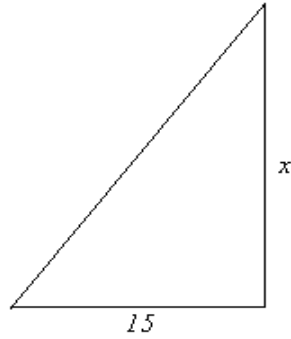
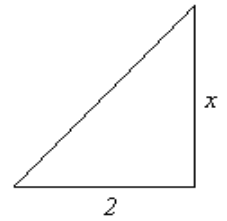
[16]



[17]



[18]



Simplify.

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

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

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

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

Perform the algebraic operations and simplify.

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

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

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

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

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

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

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

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

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

Solve for x.

[32] $\frac{x-1}{3} = \frac{x+3}{15}$

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

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

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

ANSWERS

[1] $w = 3$

[5] **DELETED**

[9] $\frac{5}{4} = \frac{x+7}{12}, x = 8$

[12] $\frac{387}{24} = \frac{x}{17}$

[16] $x = 25$

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

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

[28] $\frac{x-4}{x-3}$

[32] $x = 2$

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

[2] $c = 36$

[6] **DELETED**

[10] $\frac{x}{6} = \frac{x+2}{12}, x = 2$

[13] $\frac{185}{13} = \frac{243}{x}$

[17] $x = 3$

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

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

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

[33] $x = 4$ or $x = -7$

[3] 19.1 cm

[7] **DELETED**

[11] $\frac{x}{7} = \frac{1}{x+6}, x = 1$ or $x = -7$

[14] $\frac{3}{20} = \frac{x}{37}$

[18] $x = 5$

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

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

[30] $\frac{x-3}{x-1}$

[34] $x = 5$ or $x = -2$

[4] $\$7.20$

[8] $\frac{x}{12} = \frac{8}{3}, x = 32$

[15] $\frac{17}{19} = \frac{68}{x}$

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

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

[27] $\frac{x-3}{2}$

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