Math 114
Absolute Value & 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] $3 + |2x + 1| = 10$

[6] $|3x - 2| < 8$

[7] $|5 - 4x| > 11$

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 ?

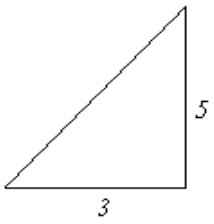
[13] A car can travel 185 kilometers on 13 liters of gas.
How many liters of gas does it need to travel 243 kilometers ?

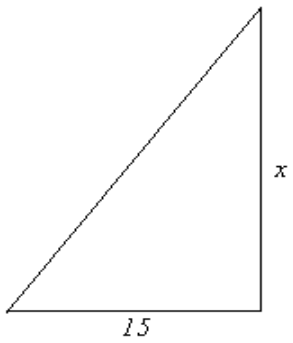
[14] On a blueprint, 3 centimeters represents 20 meters.
What length on the blueprint represents 37 meters ?

[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]





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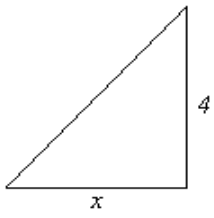

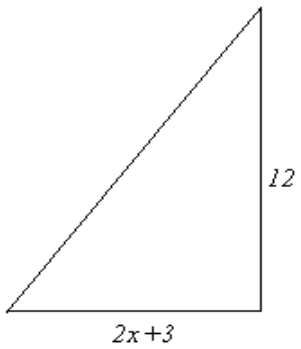

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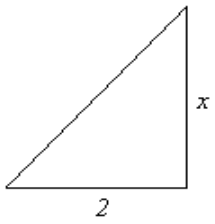

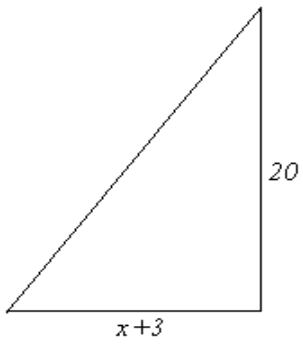

Simplify.

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

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

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

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

Perform the algebraic operations and simplify.

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

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

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

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

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

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

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

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

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

Solve for x.

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

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

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

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

ANSWERS

[1] $w = 3$

[2] $c = 36$

[3] 19.1 cm

[4] \$7.20

[5] $x = 3$ or $x = -4$

[6] $-2 < x < \frac{10}{3}$

[7] $x < -\frac{3}{2}$ or $x > 4$

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

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

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

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

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

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

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

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

[16] $x = 25$

[17] $x = 3$

[18] $x = 5$

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

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

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

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

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

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

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

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

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

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

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

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

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

[32] $x = 2$

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

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

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