

R.5 Day 1 Challenge  
Honors Algebra 2 with Trig

1. Simplify the rational expressions:

a.  $\frac{x^{3y}+4x^{2y}-3x^y-12}{x^y+4}$

b.  $\frac{5x^{3a}+5x^{2a}y^a}{x^{2a}-y^{2a}}$

c.  $\frac{j^3k+j^3-k^4-k^3}{j^2k+j^2+jk^2+jk+k^3+k^2}$

2. Simplify the following:

a.  $\frac{4r^2+2rs+s^2}{2r+s} \cdot \frac{4r^2-s^2}{8r^3-s^3}$

b.  $\frac{2a^2-2a-12}{a^2-49} \cdot \frac{4a^2-1}{2a^2+5a+2} \cdot \frac{2a^2-13a-7}{2a^2-7a+3}$

c.  $\frac{p^3-4p^2+p-4}{2p^3-8p^2+p-4} \cdot \frac{2p^3+2p^2+p+1}{p^4-p^3+p^2-p}$

3. Solve the following equation for  $y$  in terms of  $x$ , and write the resulting expression for  $y$  in simplest form. Identify any excluded values of  $x$ .

$$x^2(y + 1) = 9(y + 1) + 4x + 12$$

4. (NCTM March 2016 #11)

Find all the common factors for the following three expressions:

$$6x^2 + 5x - 4$$

$$4x^3 - 2x^2 + 8x - 4$$

$$4x^2 + 6x - 4$$

5. (NCTM May 2015 #16)

If

$$x + \frac{1}{x} = \sqrt{22}$$

find the exact value of

$$x^2 + \frac{1}{x^2}$$

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6. (NCTM April 2014 #6) Find the domain of the following function:

$$f(x) = \frac{2x - 5 - \frac{3}{x}}{5x - 13 - \frac{6}{x}}$$