

7.1

Friday, August 24, 2012
10:53 AM

Evaluating Rational Expressions

② Find $\frac{3x^2-2x}{4x+7}$ for $x=-2$

$$\frac{3(-2)^2-2(-2)}{4(-2)+7} = \frac{12+4}{-8+7} = \frac{16}{-1} = -16$$

Be careful of dividing by zero.

③ Find $\frac{x^2+3}{2x-4}$ for $x=2$ and $x=0$

$$\text{for } x=2 \quad \frac{(2)^2+3}{2(2)-4} = \frac{4+3}{4-4} = \frac{7}{0} \text{ is undefined!}$$

$$\text{for } x=0 \quad \frac{0^2+3}{2 \cdot 0-4} = \frac{3}{-4} = -\frac{3}{4}$$

notice that $\frac{x^2+3}{2x-4}$ is undefined at $x=2$ but IS defined everywhere else!

④ Find all values for which $\frac{2x+3}{x^2+3x+2}$ is undefined!

$$x^2+3x+2 = 0$$

$$x+1=0 \quad \text{or} \quad x+2=0$$

$$\text{undefined } x = -1 \quad \text{or} \quad x = -2$$

Rational Expression - like a fraction w/ expressions

Simplifying Rational Expressions

ex) $\frac{x^2}{x}$ or $\frac{x^2-4x}{x+1}$

We simplify rational expressions just like we simplify fractions.

ex) In. $\frac{x^2}{15x} = \frac{2 \cdot \overset{6}{\cancel{3}} \cdot \overset{15}{\cancel{3}} \cdot x \cdot x}{\overset{3}{\cancel{3}} \cdot \overset{5}{\cancel{5}} \cdot x}$

So ... $\frac{6x^2}{15x} = \frac{2 \cdot \overset{6}{\cancel{3}} \cdot \overset{15}{\cancel{3}} \cdot x \cdot x}{\overset{3}{\cancel{3}} \cdot \overset{5}{\cancel{5}} \cdot x} = \frac{2x}{5}$

Sometimes more complicated

ex) $\frac{x^2+4x+4}{3x^2+6x} = \frac{(x+2)(\cancel{x+2})}{3x(\cancel{x+2})} = \frac{(x+2)}{3x}$

Division by 1.

ex) $\frac{x^2-2x-3}{x-3} = \frac{(x+1)(\cancel{x-3})}{\cancel{x-3}} = \frac{x+1}{1}$

Factor numerator & denominator

ex) $\frac{x(x-3)-4(x-1)+6}{x(x+3)-5(x+3)}$

$= \frac{x^2-3x-4x+4+6}{x^2+3x-5x-15}$

$= \frac{x^2-7x+10}{x^2-2x-15}$

$= \frac{(x+2)(x-5)}{(x+3)(x-5)}$

$= \frac{x+2}{x+3}$

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~~Dividing Polynomials That Are Negatives~~

ex) $\frac{x-2}{2-x} = \frac{x-2}{-(-2+x)}$

$\frac{\cancel{x-2}}{-\cancel{(x-2)}} = \frac{1}{-1} = -1$

General Approach (to simplifying Rational Exp)

- 1. factor the numerator
- 2. factor the denominator
- 3. Cancel any common factors