

Lesson 41- Objective: SWBAT reduce algebraic fractions.

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Complete question 4 from yesterdays worksheets!

$f(x) = \frac{x^2 - x - 1}{x - 3}$
 VA $\rightarrow x - 3 = 0$
 $x = 3$
 HA $\rightarrow \frac{x^2}{x} \rightarrow x$
 SA $\rightarrow y = x + 2$
 $x - 3 \mid x^2 - x - 1$
 $\underline{-(x^2 + 3x)}$
 $ -4x - 1$
 $ \underline{-(4x + 12)}$
 $ 11$
 $f(4) = 11$
 $f(5) = 19/2$
 x -int $(-6, 0)$
 $(-1, 0)$
 y -int $(0, 1/3)$
 $\frac{x^2 - x - 1}{x - 3} = 0$
 $\frac{0^2 - 0 - 1}{0 - 3} = \frac{1}{3}$
 $x^2 - x - 1 = 0$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2(a)}$
 $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-1)}}{2(1)} = \frac{1 \pm \sqrt{5}}{2}$
 $x = \frac{1 + \sqrt{5}}{2} = 1.6$
 $x = \frac{1 - \sqrt{5}}{2} = -0.6$

7) $f(x) = \frac{x^2 - 2x - 3}{x - 2}$
 VA $\rightarrow x = 2$
 HA \rightarrow none
 S.A. $\rightarrow y = x$
 x -int $(3, 0)$ $(-1, 0)$
 y -int $(0, 3/2)$
 $f(4) = \frac{5}{2}$
 $\frac{0^2 - 2(0) - 3}{0 - 2} = \frac{-3}{-2} = \frac{3}{2}$
 $\frac{(0 - 3)(0 + 1)}{0 - 2} = \frac{(-3)(1)}{-2} = \frac{3}{2}$

8) $f(x) = \frac{x^2 - 2x - 12}{x - 5}$
 HA \rightarrow none
 VA $\rightarrow x = 5$
 S.A. $\rightarrow y = x + 3$
 x -int $(4, 0)$
 $(-4, 0)$
 y -int $(0, 12/5)$
 $f(1) = 11/4$
 $f(5) = 14$

Reducing Algebraic Fractions

Try This: State the domain of each of the following:

1) $\frac{3+x}{4x}$ $4x = 0$ $x = 0$ \mathbb{R} except 0
 2) $\frac{4x}{x+4}$ \mathbb{R} except $x = -4$
 3) $\frac{x+2}{6x+18}$ \mathbb{R} except $x = -3$
 4) $\frac{x^2+3}{3x^2+10x+3}$
 $3x^2 + 10x + 3 = 0$
 $3x^2 + 7x + 9x + 3 = 0$
 $x(x+1) + 3(x+1)$
 $(x+1)(3x+3)$
 $(x+1)(3(x+1))$
 \mathbb{R} except $x = -1$
 $x = -3$

Reducing Algebraic Fractions

1) Factor the numerator and the denominator completely.
 2) Reduce by canceling **factors** from the numerator and denominator.

w/ positive coefficients!
 multiplying!

Examples:

1) $\frac{3x}{x^2+2x} = \frac{3x}{x(x+2)} = \frac{3}{x+2}$
 2) $\frac{4x+8}{x^2-2x-8} = \frac{4(x+2)}{(x-4)(x+2)} = \frac{4}{x-4}$
 3) $\frac{x-3}{x^2-9} = \frac{x-3}{(x-3)(x+3)} = \frac{1}{x+3}$
 $\frac{1}{-1} = -1$

4) $\frac{12-6x}{x^2-4}$
 $\frac{-6(\cancel{x-2})}{(x-2)(x+2)}$
 $\frac{-6}{x+2}$

5) $\frac{ax+ax}{a^2x^2-a^2x}$
 $\frac{ax(a-x)}{a^2x(x-a)}$
 $\frac{-ax}{ax} = \frac{-1}{a}$

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

Practice:

1) $\frac{x^2+4x}{x^2+2x-8}$

2) $\frac{10x^5}{2x^3+2x^2}$

3) $\frac{2x^2+18x}{2x^3-6x^2-36x}$

4) $\frac{x^2+3x-4}{7x^3+7x^2-14x}$

5) $\frac{5m^3-20m}{m^4+5m^3+6m^2}$

6) $\frac{3r^2-39r+90}{r^2-3r-70}$

7) $\frac{x^2+2x-80}{x^3+8x^2-9x}$

8) $\frac{9x^2+81x}{x^3+8x^2-9x}$

9) $\frac{4-2(x-1)}{x^2-6x+9}$

10) $\frac{2x+10}{3x+15}$