Beginning & Intermediate Algebra

11.3 – Quadratic in Form

Dec 2-10:29 AM

Example

$\frac{1}{y-5} - \frac{10}{y^2-25} = -\frac{1}{5}$

LCD: $5(y+5)(y-5)$

$(y+5)(y-5)$

WHAT'S THE RULE?

Anytime you have an **EQUATION** with **FRACTIONS** multiply by the **LCD!!!**

Dec 2-10:29 AM

Quadratic in Form

$\frac{1}{y-5} - \frac{10}{y^2-25} = -\frac{1}{5}$

LCD: $5(y+5)(y-5)$ $y \neq -5, 5$

$(y+5)(y-5)$

$1(5)(y+5) - 10(5) = -1(y^2-25)(y+5)(y-5)$

$5y+25-50 = -y^2+25$

$5y-25 = -y^2+25$

$-25 \quad +y^2-25$

$+y^2$

$y^2+5y-30=0$

$(y+10)(y-5)=0$

$y=-10, 5$ X

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Example – Equation with Fractions

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

LCD: $3(2x+3)(x-6)$

$6(3)(x-6) = 2(3)(2x+3) + 4(2x+3)(x-6)$

$18x-108 = 12x+18 + 8x^2-36x-72$

$18x-108 = 8x^2-24x-54$

$-18x+108 \quad -18x+108$

$8x^2-42x+54=0$

$4x^2-21x+27=0$

$a=4$

$b=-21$

$c=27$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{21 \pm \sqrt{(-21)^2-4(4)(27)}}{2(4)}$

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Example – Negative Exponents

$1+5x^{-1}+6x^{-2}=0$

LCD: x^2

$x^2\left(1 + \frac{5}{x} + \frac{6}{x^2}\right) = 0$

$x^2+5x+6=0$

$(x+3)(x+2)=0$

$x=-3, -2$

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Example – Radical Equations

$3x+4\sqrt{x}-4=0$ How do you get rid of radicals?

$-3x \quad -4$

$(4\sqrt{x})^2 = (4-3x)^2$

$(4-3x)$

$16x = 16-24x+9x^2$

$-16x \quad -16x$

$0 = 9x^2-40x+16$

Don't forget to check for extraneous solutions.

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Example – Higher Power

$x^4 - 13x^2 + 36 = 0$

$x^2 - 13x + 36 = 0$

$(x^2 - 9)(x^2 - 4) = 0$

$(x+3)(x-3)(x+2)(x-2) = 0$

$x = 3, -3, 2, -2$

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Example – Substitution

$(x-3)^2 + 2(x-3) - 15 = 0$

Choose something LESS complicated for something MORE complicated.

Substitution:

$u = x - 3$

$u^2 + 2u - 15 = 0$

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Example – Substitution

$(x-3)^2 + 2(x-3) - 15 = 0$

$u = (x-3)$

$u^2 + 2u - 15 = 0$

$(u-3)(u+5) = 0$

$u = 3$ $\quad$ $u = -5$

$x - 3 = 3$ $\quad$ $x - 3 = -5$

$+3 \quad +3$ $\quad$ $+3 \quad +3$

$x = 6$ $\quad$ $x = -2$

Dec 2-10:29 AM

Example - Substitution

$3x^{\frac{2}{3}} - 4x^{\frac{1}{3}} - 4 = 0$

$u = x^{1/3}$

$x^{2/3} = (x^{1/3})^2$

$3(x^{1/3})^2 - 4x^{1/3} - 4 = 0$

$3u^2 - 4u - 4 = 0$

-12

$u^2 - 4u - 12 = 0$

$(u + 2)(u - 6) = 0$

$u = -2 \quad u = 6$

$x^{1/3} = -2$ $\quad$ $x^{1/3} = 6$

$(\sqrt[3]{x})^3 = (-2)^3$ $\quad$ $(\sqrt[3]{x})^3 = 6^3$

$x = -8$ $\quad$ $x = 216$

Dec 2-10:29 AM