Topic: Rational Expressions (P.6) & Equations (P.7)

Question: Which type of equation do you have the most trouble with? Explain.

Warm-Up

a.) $\dfrac{x^2+6x+5}{x^2-25}$

$\dfrac{\cancel{(x+5)}(x+1)}{\cancel{(x+5)}(x-5)}$

$\boxed{\dfrac{x+1}{x-5}}$

$5 \times 1 = 5$, 6 $\quad x^2+6x+5$, $x^2+5x+x+5$, $x(x+5)+1(x+5)$, $(x+1)(x+5)$ $\quad 5 \times -5 = -25$, 0

$\dfrac{p}{q}$

$\dfrac{8}{6} = \dfrac{\cancel{2}\cdot 2\cdot 2}{\cancel{2}\cdot 3} = \dfrac{4}{3}$

b.) $\dfrac{x+3}{x^2-4} \cdot \dfrac{x^2-x-6}{x^2+6x+9}$

$\dfrac{\cancel{(x+3)}}{(x-2)\cancel{(x+2)}} \cdot \dfrac{(x-3)\cancel{(x+2)}}{\cancel{(x+3)}(x+3)}$

$\boxed{\dfrac{x-3}{(x-2)(x+3)}}$

$\dfrac{2}{3} \cdot \dfrac{9}{4} = \dfrac{18}{12} = \dfrac{2\cdot 3\cdot 3}{2\cdot 2\cdot 3}$

1.) $\frac{x}{x+1} - \frac{3x+2}{x+1}$

$\frac{1}{3} - \frac{2}{3} = \frac{1-2}{3}$

$\frac{x-(3x+2)}{x+1}$

$\frac{x-3x-2}{x+1}$

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

$\frac{-2(x+1)}{x+1}$

-2

2.) Find the least common denominator

$\frac{3}{x^2-6x+9}$ and $\frac{7}{x^2-9}$

$\frac{2}{3}$ and $\frac{1}{5}$

15

$x^2-6x+9=(x-3)(x-3)$

$x^2-9=(x-3)(x+3)$

$\boxed{(x-3)(x-3)(x+3)}$

3.) Simplify

$$\frac{x+3}{x^2+x-2} + \frac{2}{x^2-1}$$

LCD

$x^2+x-2=(x+2)(x-1)$

$x^2-1=(x+1)(x-1)$

$(x+1)(x+2)(x-1)$

$$\frac{x+3}{(x+2)(x-1)}\cdot\frac{(x+1)}{(x+1)} + \frac{2}{(x-1)(x+1)}\cdot\frac{(x+2)}{(x+2)}$$

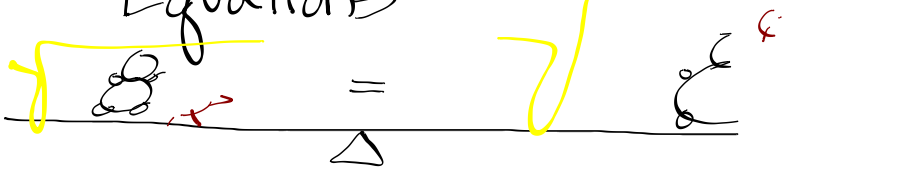
$$\frac{(x+3)(x+1)+2(x+2)}{(x+2)(x-1)(x+1)}$$

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

$$\boxed{\frac{x^2+6x+7}{(x+2)(x-1)(x+1)}}$$

P.7

Equations



$$\frac{2+c}{2} = \frac{\sqrt{x}}{2} + \frac{x^2}{2} + \frac{3}{2}$$

$2x = 4$

$2x+1 = 4+1$

$2x+1+\square = 4+1+\square$

Its ok, but not smart

linear equations

4.) $4(2x+1) = 29 + 3(2x-5)$

$8x + 4 = 29 + 6x - 15$

$-4 \qquad -4$

$8x = 29 + 6x - 15 - 4$

$8x = 6x + 10$

$-6x \quad -6x$

$\frac{1}{2} \cdot 2x = 10 \cdot \frac{1}{2}$

$x = 5$ ✓

Absolute Value Equations

$|x| = a$

$x = a \qquad x = -a$

$|2x+1| = 5$

$|x| = a$

$2x+1 = 5 \qquad 2x+1 = -5$

$2x = 4 \qquad 2x = -6$

$x = 2 \qquad x = -3$

$|x| = 5$

$x = 5 \qquad x = -5$

5.) Solve

$5|1-4x|-15=0$

$5\cdot|1-4x|=15$

$|1-4x|=3$

$|x|=a$

$x=a \quad x=-a$

1.) Get abs. val by itself

2.) Use definition of abs. value

3.) Check

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

$1-4x=-3$
$-4x=-4$
$x=1$ ✓

b.) $\frac{4|1-2x|-20}{4}=\frac{0}{4}$

$|1-2x|-5=0$

$|1-2x|=5$

$1-2x=5$
$-2x=4$
$x=-2$ ✓

$1-2x=-5$
$-2x=-6$
$x=3$ ✓

Quadratic Equations

by factoring

$AB=0$ then $A=0$ or $B=0$ zero product property

by square root

$x^2=4$
$x=2 \quad x=-2$

if $x^2=a$, then $x=\sqrt{a}$ or $-\sqrt{a}$

by completing the square

$\left(\frac{b}{2}\right)^2$

by quadratic equation

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

Solve by factoring

a.) $2x^2 + 7x = 4$

$2x^2 + 7x - 4 = 0$

$2x^2 + 8x - 1x - 4 = 0$

$2x(x+4) - 1(x+4) = 0$

$A \cdot B = 0$

$(2x-1)(x+4) = 0$

$2x - 1 = 0$ $\quad$ $x + 4 = 0$

$2x = 1$ $\quad$ $x = -4$

$x = \frac{1}{2}$

-8, -1, 8, 7

$AB = 0$

$A = 0$ or $B = 0$

b.) $3x^2 - 15x = 0$

$A \cdot B = 0$

$3x(x-5) = 0$

$3x = 0$ $\quad$ $x - 5 = 0$

$x = 0$ $\quad$ $x = 5$

c.) $2x^2 + x = 1$

$2x^2 + x - 1 = 0$

$(2x-1)(x+1) = 0$

$2x - 1 = 0$ $\quad$ $x + 1 = 0$

$2x = 1$ $\quad$ $x = -1$

$x = \frac{1}{2}$

-2, -1, 2, 1

pp 93-94

1-123 odds. A

every other odd B