Rational Functions

* Simplify Complicated Rational expressions
* Solve rational eqs. & inequalities

Simplify.

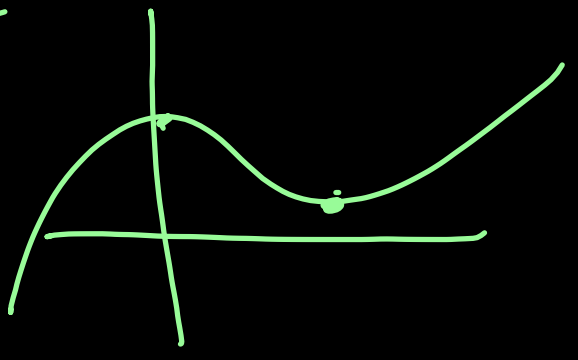
$$\frac{4x^2(x+3)^{-2} - 24x(x+3)^{-1}}{(x+3)^3}$$

$$\frac{4x(x+3)^{-2}\left[x - 6(x+3)^{1}\right]}{(x+3)^{3+2}}$$

$$\frac{4x\left[x - 6x - 18\right]}{(x+3)^5}$$

$$= \frac{4x\left[-5x - 18\right]}{(x+3)^5}$$

$$\boxed{\frac{-4x(5x+18)}{(x+3)^5}}$$



$$\frac{6(2x+5)^{3-2}(4x-7x^2)^{-1/4}(4-7x) - (4x-7x^2)^{3/4+\frac{-1}{4}}(10)(2x+5)^2}{[(2x+5)^3]^2}$$

$$\frac{2\cdot(2x+5)^{2}\cdot(4x-7x^2)^{-1/4}\left[3(2x+5)(4-7x) - 5(4x-7x^2)^{1}\right]}{(4x-7x^2)^{1/4}(2x+5)^{6-2}}$$

$$\frac{2\left[3\left(-14x^2-27x+20\right) - 8x - 14x^2 + 20 - 35x\right] - 20x + 35x^2}{(4x-7x^2)^{1/4}(2x+5)^4}$$

$$\frac{2\left[-42x^2-81x+60-20x+35x^2\right]}{(4x-7x^2)^{1/4}(2x+5)^4}$$

$$\frac{2\left[-7x^2-101x+60\right]}{(4x-7x^2)^{1/4}(2x+5)^4}$$

Solving Rational Equations & Inequalities

$$2(2x-1)(x+1)\left[\frac{1}{2x-1}+\frac{1}{x+1}=\frac{3}{2}\right]$$

Excluded values

$x \neq \frac{1}{2}, -1$

$$2(x+1)+2(2x-1)=3(2x-1)(x+1)$$

$$2x+2+4x-2=3(2x^2+x-1)$$

$$6x=6x^2+3x-3$$

$$-6x \quad\quad -6x$$

$$0=6x^2-3x-3$$

$$0=3(2x^2-x-1)$$

$$0=3(2x+1)(x-1)$$

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

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

$$1 + \frac{3y}{y-1} > 2$$
$$-2 \qquad -2$$

$$\frac{3y}{y-1} - \frac{1}{1}\cdot\frac{(y-1)}{(y-1)} \geq 0$$

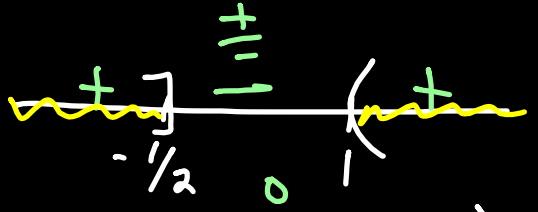
$$\frac{3y - y + 1}{y-1} \geq 0$$

$$\frac{2y+1}{y-1} \geq 0$$

$+$

* Cannot multiply by a variable expression + cancel denom!

1) Set <0 OR >0
2) Make common denom.
3) Test Points!



$(-\infty, -\frac{1}{2}] \cup (1, \infty)$

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