FINDING EQ. FROM ROOTS – Reverse factoring

Roots: $-2,\ 5$

$x = -2 \qquad x = 5$

$x + 2 = 0 \qquad x - 5 = 0$

$(x+2)(x-5) = 0$

$x^2 - 3x - 10 = 0$

$x = 4 - \sqrt{3},\ 4 + \sqrt{3}$

$x = 4 - \sqrt{3} \qquad x = 4 + \sqrt{3}$

$x - 4 + \sqrt{3} = 0 \qquad x - 4 - \sqrt{3} = 0$

$((x-4) + \sqrt{3})((x-4) - \sqrt{3}) = 0$

$(x-4)^2 - 3$

$(x-4)(x-4)$

$x^2 - 8x + 16 - 3$

$\boxed{x^2 - 8x + 13 = 0}$

SIMPLIFY.

- Pull out common factors

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

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

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

$$\frac{2\left[24x-42x^2+60-105x-20x+35x^2\right]}{(2x+5)^4(4x-7x^2)^{1/4}}$$

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

SOLVING RATIONAL EQUATIONS

$x \neq 2, 7$

$$\frac{x}{x-2} + \frac{x-3}{7-x} = \frac{-x-1}{-x^2+9x-14}$$

$-(x^2-9x+14)$

$+(x-7)(x-2)$

= Sign

Multiply by common denom & cancel all denoms!

$$(x-2)(x-7)\left[\frac{x}{\cancel{x-2}} - \frac{x-3}{\cancel{x-7}} = \frac{-x-1}{\cancel{(x-7)}\cancel{(x-2)}}\right]$$

$$x(x-7) - (x-3)(x-2) = -x-1$$

$$x^2 - 7x - [x^2 - 5x + 6] = -x - 1$$

$$\cancel{x^2} - 7x - \cancel{x^2} + 5x - 6 = -x - 1$$

$$-2x - 6 = -x - 1$$

$$\boxed{-5 = x}$$

Solve

$$\left[\,1 + \frac{3}{y-1} > 2\,\right]$$
$$-2 \qquad\qquad -2$$

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

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

$$\frac{4-y}{y-1} > 0 \;\leftarrow + \text{ solutions}$$

$\pm$

$- \; - \; (\; + \;) \; -$

$0 \quad 1 \quad 4$

$(1, 4)$

1) Set >0 or <0
2) Make & Keep Common denom
3) Test Points!