

Solve the equation algebraically. Check for extraneous solutions.

A) $\left(\frac{2x}{x-1}\right)^{(x-1)(x-3)} + \left(\frac{1}{x-3}\right)^{(x-1)(x-3)} = \left(\frac{2}{x^2-4x+3}\right)^{(x-1)(x-3)}$ $x=1$ $x=3$

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

$$2x^2 - 6x + x - 1 = 2$$

$$2x^2 - 5x - 3 = 0$$

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

$$2x+1=0$$

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

$$x-3=0$$

$$x = 3$$

← extraneous

$x=0, -2$

Common Denom
 $x(x+2)$

B) $\left(\frac{x-3}{x}\right)^{x(x+2)} + \left(\frac{3}{x+2}\right)^{x(x+2)} + \left(\frac{6}{x^2+2x}\right)^{x(x+2)} = 0$

$$(x-3)(x+2) + 3x + 6 = 0$$

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

$$x^2 + 2x = 0$$

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

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

Both
extraneous

No Solution

$$x^2 - 5 = 0$$

$$x = \pm\sqrt{5}$$

Solve the equation

$$\text{A) } \left(\frac{x^2 - 4x + 3}{x^2 - 5} \right)^{\cancel{(x^2 - 5)}} = \cancel{(3)} (x^2 - 5)$$

$$\begin{aligned}x^2 - 4x + 3 &= 3x^2 - 15 \\ &= 2x^2 + 4x - 18 \\ &= x^2 + 2x - 9\end{aligned}$$

$$\begin{aligned}& -1 \pm \sqrt{10} \\ & -1 \pm \frac{\sqrt{40}}{2}\end{aligned}$$

$$\begin{aligned}-\frac{2}{2} \pm \frac{\sqrt{(2)^2 - 4(1)(9)}}{2} \\ \frac{\sqrt{4 - 36}}{2}\end{aligned}$$

$$\text{B) } (x^2)^x + \left(\frac{2}{x}\right)^x = \cancel{(3x)}x$$

$$x^4 + 2 = 3x$$

$$x^4 - 3x^2 + 2 = 0$$

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

$$x = \pm\sqrt{2} \quad x = \pm 1$$