

$$\frac{x+40}{x^3-16x} = \frac{x-4}{3x^2+11x-4} - \frac{16}{16-x^2}$$

$$\frac{x+40}{x(x-4)(x+4)} = \frac{x-4}{(3x-1)(x+4)} - \frac{16}{(4-x)(4+x)}$$

$3x^2+11x-4$   
 $x_1, x_2 = \frac{-b \pm \sqrt{d}}{2a}$   
 $d = b^2 - 4ac$   
 $d = 11^2 - 4 \cdot 3 \cdot (-4) = 11^2 + 4 \cdot 3 \cdot 4 = 121 + 48 = 169$   
 $x_1 = \frac{-11 + 13}{2 \cdot 3} = \frac{2}{6} = \frac{1}{3}$   
 $x_2 = \frac{-11 - 13}{2 \cdot 3} = \frac{-24}{6} = -4$   
 $3(x - \frac{1}{3})(x + 4) = (3x - 1)(x + 4)$   
 $f(x) = ax^2 + bx + c = a(x - x_1)(x - x_2)$

$$\frac{x+40}{x(x-4)(x+4)} = \frac{(x-4)(4-x) - 16(3x-1)}{(x+4)(4-x)(3x-1)}$$

$$\frac{x+40}{x(x-4)(x+4)} = \frac{4x - x^2 - 16 + 4x - 48x + 16}{(x+4)(4-x)(3x-1)}$$

$$\frac{x+40}{x(x-4)(x+4)} = \frac{-x^2 - 40x}{(x+4)(4-x)(3x-1)}$$

$$\frac{x+40}{x(x-4)(x+4)} * \frac{(x+4)(4-x)(3x-1)}{-x^2 - 40x} = \frac{(x+4)(4-x)(3x-1)(x+40)}{(x^2 + 40x)(x(4-x)(x+4))}$$

$$\frac{(3x-1)(x+40)}{(x^2+40x)x} = \frac{(3x-1)(x+40)}{x^2(x+40)} = \frac{(3x-1)}{x^2}$$