

$$3. \frac{2x^2}{3x^2-4x} = \frac{2x(x)}{x(3x-4)} = \frac{2x}{3x-4} = \frac{2x}{3x-4}; x \neq 0$$

Numerator
 $2x^2$
 $2x(x)$

Denominator
 $3x^2-4x$
 $x(3x-4)$

$$5. \frac{x^2-3x-18}{x^2-7x+6} = \frac{(x-6)(x+3)}{(x-1)(x-6)} = \frac{x+3}{x-1} \quad x \neq 6$$

$x \neq 18 \quad x=6$

Numerator:
 $x^2-3x-18$
 $x \quad -6$
 $x \quad 3$
 $-6x+3x$
 $-3x$
 $(x-6)(x+3)$

Denominator:
 x^2-7x+6
 $x \quad -1$
 $x \quad -6$
 $-6x-x = -7x$
 $(x-1)(x-6)$

$$7. \frac{x^2+11x+18}{x^3+8} = \frac{(x+9)(x+2)}{(x+2)(x^2-2x+4)} = \frac{x+9}{x^2-2x+4} \quad x \neq -2$$

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

Numerator:
 $x^2+11x+18$

Denominator:
 x^3+8

$x \quad 9$
 $x \quad 2$
 $2x+9x-11x$
 $(x+9)(x+2)$

$(x+2)(x^2-2x+4)$

$$11. \frac{4xy^3}{x^2y} \cdot \frac{1}{8x} = \frac{4xy^3}{8x^3y} = \frac{1xy^3}{2x^3y} = \frac{1x^{-2}y^3}{2x^2} = \frac{y^3}{2x^2} \quad y \neq 0$$

$x^{3-3} = x^{-2}$
 $y^{4-1} = y^3$

$$13 \quad \frac{x^2(x-4)}{x-3} \cdot \frac{(x-3)(x+6)}{x^3} = \frac{x^2(x-4)(x+6)}{x^3(x-3)} = \frac{x^2(x-4)(x+6)}{x^3(x-3)}$$

$$\frac{(x-4)(x+6)}{x^2} \quad x \neq 3$$

$$15 \quad \frac{x^2-3x}{x-2} \cdot \frac{x^2+x+6}{x}$$

$$\frac{x(x-3)}{x-2} \cdot \frac{(x+3)(x+2)}{x} = (x-3)(x+3) = x^2-3x+6x = x^2+9 \quad ; \quad x \neq 0, 2$$

Numerator 1:
 x^2-3x
 $x(x-3)$

Numerator 2:
 x^2+x+6
 $x \quad 3$
 $x \quad -2$
 $-2x+6-x$
 $(x+3)(x-2)$

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

$$17 \quad \frac{x^2+3x-4}{x^2+4x+4} \cdot \frac{2x^2+4x}{x^2-4x+3} = \frac{(x+4)(x-1)}{(x+2)(x+2)} \cdot \frac{2x(x+2)}{(x-1)(x-3)} = \frac{2x(x+4)}{(x-3)(x+2)} \quad x=1$$

Numerator 1:
 x^2+3x-4
 $x \quad 4$
 $x \quad -1$
 $-x+4x=3x$
 $(x+4)(x-1)$

Numerator 2:
 $2x^2+4x$
 $2x(x+2)$

Denominator 1:
 x^2+4x+4
 $x \quad 2$
 $x \quad 2$
 $2x+2x=4x$
 $(x+2)(x+2)$

Denominator 2:
 x^2-4x+3
 $x \quad -1$
 $x \quad -3$
 $-3x-4=-4x$
 $(x-1)(x-3)$

Denominator 1:
 x^2+4x+4
 $x \quad 2$
 $x \quad 2$
 $2x+2x=4x$
 $(x+2)(x+2)$

Denominator 2:
 x^2-4x+3
 $x \quad -1$
 $x \quad -3$
 $-3x-4=-4x$
 $(x-1)(x-3)$