

$$\boxed{6} \quad \lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x^2 - 8x + 15} = (1)$$

$$(x^2 - 5x + 6)_{x=3} = 3^2 - 5 \cdot 3 + 6 = 9 - 15 + 6 = 15 - 15 = 0$$

$$(x^2 - 8x + 15)_{x=3} = 3^2 - 8 \cdot 3 + 15 = 9 - 24 + 15 = 24 - 24 = 0$$

$$\begin{aligned} x^2 - 5x + 6 &= x^2 - 2x - 3x + 6 = (x^2 - 2x) + (-3x + 6) = \\ &= x(x-2) - 3(x-2) = (x-3)(x-2) \end{aligned}$$

$$\begin{aligned} x^2 - 8x + 15 &= x^2 - 3x - 5x + 15 = (x^2 - 3x) + (-5x + 15) = \\ &= x(x-3) - 5(x-3) = (x-5)(x-3) \end{aligned}$$

$$\begin{aligned} \frac{x^2 - 5x + 6}{x^2 - 8x + 15} &= \frac{(x-3)(x-2)}{(x-5)(x-3)} = \{x \neq 3\} = \\ &= \frac{x-2}{x-5} \end{aligned}$$

$$(1) = \lim_{x \rightarrow 3} \frac{x-2}{x-5} = \left( \frac{x-2}{x-5} \right)_{x=3} =$$

$$= \frac{3-2}{3-5} = \frac{1}{(-2)} = -\frac{1}{2}$$

$$\boxed{\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x^2 - 8x + 15} = -\frac{1}{2}}$$