

Знайти границю:

$$4.117. \lim_{x \rightarrow 3} \frac{\sqrt{x-2} - \sqrt{4-x}}{x^2 + x - 12}.$$

$$\left(\frac{0}{0}\right) \lim_{x \rightarrow 3} \frac{\sqrt{x-2} - \sqrt{4-x}}{x^2 + x - 12} = \lim_{x \rightarrow 3} \frac{(\sqrt{x-2} - \sqrt{4-x})(\sqrt{x-2} + \sqrt{4-x})}{(x^2 + x - 12)(\sqrt{x-2} + \sqrt{4-x})} =$$
$$\lim_{x \rightarrow 3} \frac{x-2 - (4-x)}{(x^2 + x - 12)(\sqrt{x-2} + \sqrt{4-x})} = \lim_{x \rightarrow 3} \frac{x-2-4+x}{(x-3)(x+4)(\sqrt{x-2} + \sqrt{4-x})} \quad (\Rightarrow)$$

$$x^2 + x - 12 = 0$$
$$x_1 = 3 \quad x_2 = -4$$

$$x^2 + x - 12 = (x-3) \cdot (x-(-4)) = (x-3)(x+4)$$

$$x-2-4+x = 2x-6 = 2(x-3)$$

$$\quad (\Rightarrow) \lim_{x \rightarrow 3} \frac{2(x-3)}{(x-3)(x+4)(\sqrt{x-2} + \sqrt{4-x})} = \lim_{x \rightarrow 3} \frac{2}{(x+4)(\sqrt{x-2} + \sqrt{4-x})} =$$

$$= \frac{2}{(3+4)(\sqrt{3-2} + \sqrt{4-3})} = \frac{2}{7 \cdot (1+1)} = \frac{1}{7}$$