

$(x-3)(x-\frac{1}{2})$

$$\lim_{x \rightarrow 1} \frac{5x^2 - 7x + 3}{5x^2 - 8x + 3} = \frac{(5x-3)(x-1)}{(5x-3)(x-1)} = \frac{5-3}{5-3} = \frac{1}{1}$$

9

$$\lim_{x \rightarrow 0} \frac{|3x-1| - |3x+1|}{x} = \frac{1-3x - (3x+1)}{x} = \frac{-6x}{x} = -6$$

10

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

11

$$\lim_{x \rightarrow 2} \frac{x - \sqrt{2x}}{x^2 - x - 4} = \frac{\sqrt{x}(\sqrt{x} - \sqrt{2})}{(\sqrt{x}-\sqrt{2})(\sqrt{x}+\sqrt{2})(x+2)} = \frac{\sqrt{x}}{(\sqrt{x}+\sqrt{2})(x+2)} = \frac{\sqrt{2}}{2\sqrt{2} \cdot 6} = \frac{1}{6\sqrt{2}}$$

13

$$\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{2 - \sqrt{5-x}} \times \frac{x}{x} \times \frac{1 + \sqrt{x}}{1 + \sqrt{x}} = \frac{x(1-x)}{2(x-1)(1+\sqrt{x})} = -\frac{1}{2}$$

14

$$\lim_{x \rightarrow 4} \frac{\sqrt{3x+4} - 4}{\sqrt{5x+7} - 3} \times \frac{\sqrt{3x+4} + 4}{\sqrt{3x+4} + 4} \times \frac{(\sqrt{5x+7} + 3)(\sqrt{5x+7} + 9)}{(\sqrt{5x+7} + 3)(\sqrt{5x+7} + 9)}$$

$$= \frac{5(3x+4-16)}{14(5x+7-21)} = \frac{5 \times 3(x-4)}{14 \times 5(x-4)} = \frac{15}{14}$$

16

$$\lim_{x \rightarrow 1} \frac{\sqrt{3x+\sqrt{x}} - 2}{\sqrt{x} - 1} \times \frac{\sqrt{3x+\sqrt{x}} + 2}{\sqrt{3x+\sqrt{x}} + 2} \times \frac{\sqrt{x^2+\sqrt{x}+1}}{\sqrt{x^2+\sqrt{x}+1}} = \frac{3(x^2+\sqrt{x}-1)}{x(x-1)}$$

$$= \frac{3((3\sqrt{x}+4)(\sqrt{x}-1))}{x(\sqrt{x}-1)(\sqrt{x}+1)} = \frac{3(3+4)}{x(1+1)} = \frac{21}{x}$$

18

$$\lim_{x \rightarrow \pi} \frac{1 + \cos^3 x}{\sin^2 x} = \frac{(1 + \cos x)(1 - \cos x + \cos^2 x)}{(1 + \cos x)(1 - \cos x)} = \frac{1 - (-1) + 1}{1 - (-1)} = \frac{3}{2}$$

21