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مركب و غير مركب

$$\lim_{x \rightarrow 1} \frac{x^2 - \sqrt{x+1}}{x^2 - 1} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{1 \cdot 2 - \frac{1}{2\sqrt{2}}}{2x - 1} = \frac{1}{2} \checkmark$$

(1)

$$\lim_{x \rightarrow 0} \frac{|x-1| - |x+1|}{x} = \frac{|-1-1| - |1+1|}{0} = \frac{-2 - 2}{0} = \frac{-4}{0} \xrightarrow{\text{hop}} \frac{-4}{1} = -4 \checkmark$$

(2)

$$\lim_{x \rightarrow f} \frac{x-f}{\sqrt{x}-f} \xrightarrow{\text{hop}} \frac{1}{\frac{1}{\sqrt{x}}} = f \checkmark$$

(3)

$$\lim_{x \rightarrow \sqrt{2}} \frac{x - \sqrt{x}}{\sqrt{x^2 - 2} - 1} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{1 - \frac{1}{2\sqrt{x}}}{2x - 1} = \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \checkmark$$

(4)

$$\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{\sqrt{x} - x} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{-\frac{1}{2\sqrt{x}}}{\frac{1}{2\sqrt{x}} - 1} = \frac{-\frac{1}{2}}{\frac{1}{2} - 1} = 1 \checkmark$$

(5)

$$\lim_{x \rightarrow f} \frac{\sqrt{x+f} - f}{\sqrt{x^2 + 1} - f} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{\frac{1}{2\sqrt{x+f}}}{\frac{2x}{2\sqrt{x^2+1}}} = \frac{1}{2} = \frac{1}{2} \checkmark$$

(6)

$$\lim_{x \rightarrow 1} \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{\frac{1}{2\sqrt{x+1}}}{\frac{1}{2\sqrt{x}}} = \frac{1}{1} = 1 \checkmark$$

(7)

$$\lim_{x \rightarrow \pi} \frac{1 + \cos x}{\sin x} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{(1 + \cos x)(1 + \cos x)}{(1 - \cos x)(1 + \cos x)} = \frac{1}{2} \checkmark$$

(8)

$$\lim_{x \rightarrow \frac{\pi}{4}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{1 - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{\cos x - \sin x}{\cos x}}{\sin x - \cos x} = \frac{-1}{\cos x} = \frac{-1}{\frac{\sqrt{2}}{2}} = -\sqrt{2} \checkmark$$

(9)

$$\lim_{x \rightarrow \frac{\pi}{4}} \frac{\tan x - 1}{\cos x} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{\frac{\sin x}{\cos x} - 1}{\cos x} = \frac{\frac{\sin x - \cos x}{\cos x}}{\cos x} = \frac{-1}{\cos x} = \frac{-1}{\frac{\sqrt{2}}{2}} = -\sqrt{2} \checkmark$$

(10)