① امیر مهدی میرزایی [redacted] ریاضی ۱۶ B

۲۰

۱۹٫۵

(۲)

$$\lim_{x\to 1} \frac{(x-\frac{3}{2})(x-1)\times 4}{(x-\frac{3}{5})(x-1)\times 5} = \frac{1}{2}$$ ✓

---

② (۲)

$$\lim_{x\to 0} \frac{|3x-1| - |3x+1|}{x}$$

$-6 \quad \overset{0}{\dagger} \quad -6 \quad \Big| \quad \frac{-2}{x}$

$$\Rightarrow \lim_{x\to 0} f(x) = -6$$ ✓

---

③ (۲)

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

---

④ (۱٫۷۵)

$$\lim_{x\to 2} \frac{\sqrt{2}\sqrt{x}(\sqrt{x}-\sqrt{2})}{2(x-2)(x+1.5)} = \frac{1}{14}$$ ✓

$$\xrightarrow{Hop} \lim_{x\to 2} \frac{1-\frac{1}{\sqrt{2x}}}{4x-1} = \frac{\frac{1}{2}}{7} = \frac{1}{14}$$

---

⑤ (۲)

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

---

⑥ (۱٫۷۵)

$$\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} \times \frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4} \times \frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}$$

$$= \frac{3x-12}{5x-20} = \frac{3}{5} \times \frac{27}{8} = \frac{81}{40}$$

دقت!

$$\xrightarrow{Hop} \lim_{x\to 4} \frac{\frac{3}{2\sqrt{3x+4}}}{\frac{5}{3\sqrt[3]{(5x+7)^2}}} = \frac{\frac{3}{8}}{\frac{5}{27}} = \frac{81}{40}$$

(٧) (٢)

$$\lim_{x\to 1} \frac{\sqrt{x^3+\sqrt{x}}-2}{\sqrt[3]{x}-1} \times \frac{\sqrt{x^3+\sqrt{x}}+2}{\sqrt{x^3+\sqrt{x}}+2} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}$$

$$= \frac{x^3+\sqrt{x}-4}{x-1} \times \frac{3}{4} = \frac{21}{8}$$

(٨) (٢)

$$\lim_{x\to 0} \frac{1+\cos^3 x}{\sin^2 x} \Rightarrow \frac{(\cos x+1)(\cos^2 x-\cos x+1)}{1-\cos^2 x}$$

$$= \frac{\cos^2 x-\cos x+1}{1-\cos x} = \frac{3}{2}$$

(٩) (٢)

$$\lim_{x\to \frac{\pi}{4}} \frac{1+\tan x}{\sin x+\cos x} = \frac{\frac{\cos x+\sin x}{\cos x}}{\sin x+\cos x} = \frac{1}{\cos x} \Rightarrow \sqrt{2}$$

(١٠) (٢)

$$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$$

$$\Rightarrow \tan^2\alpha - 1 = \frac{\sin^2\alpha - \cos^2\alpha}{\cos^2\alpha} \Rightarrow \frac{\tan^2\alpha+1}{\cos 2\alpha} = -\frac{1}{\cos^2 2\alpha}$$

$$\lim_{\alpha\to \frac{\pi}{4}} \Rightarrow -2$$