۱)

$$\log_{\frac{1}{2}}^{(-b)} 1 = -1 \Rightarrow \frac{1}{2} = -b \Rightarrow b = -\frac{1}{2}$$

$$\log_{\frac{1}{2}}^{(-b)} 2 = -1 \Rightarrow \frac{2}{3} = -b \Rightarrow b = -\frac{2}{3}$$

$$\Rightarrow \frac{1}{2} + b = -\frac{2}{3} \Rightarrow b = -\frac{7}{6}$$

$$\Rightarrow 2^{-1} + c = 0 \Rightarrow \frac{1}{2} + c = 0 \Rightarrow c = -\frac{1}{2}$$

$$\Rightarrow a = 1 - \log_{\frac{1}{2}}^{(-1.5a+2)} 1$$

$$\Rightarrow 1 = -1.5a + 2 \Rightarrow a = \frac{1}{3}$$

$$\Rightarrow \log_{\frac{1}{2}}^{(\frac{1}{3}+1)} = \log_{\frac{1}{2}}^{(\frac{1}{2}+b)} \Rightarrow \frac{1}{2} + b = \frac{4}{3} \Rightarrow b = \frac{5}{6}$$

$$\Rightarrow 2 - \left(\frac{1}{2}+1\right) = \log_{\frac{1}{2}}^{(c+\frac{1}{2})} \Rightarrow \frac{1}{2} = c + \frac{1}{2} \Rightarrow c = 0$$

$$\Rightarrow a + b + c = \frac{4}{3}$$

۲)

$$f(x) = x^a + c \Rightarrow \begin{cases} 1 = 1 + c \Rightarrow c = 0 \\ -\frac{1}{2} = c \times 2^a \Rightarrow -\frac{1}{2} = 1 \times 2^a \Rightarrow a = -1 \end{cases}$$

$$f(x) = x^{-1}$$

$$f(-1) = (-1)^{-1} = -1$$

$$f(b) = -1 \Rightarrow b^{-1} = -1 \Rightarrow b = -1$$

$$f(-1) + f(b) = -2$$

۳)

$$\log_{\sqrt{3}}^{(b)} 2 = 4 \Rightarrow \log_{3^{\frac{1}{2}}}^{(b)} 2 = 4 \Rightarrow \log_3^{(b)} 2 = 2$$

$$\Rightarrow b = 2^{-2} = \frac{1}{4}$$

$$\log_{\frac{1}{4}}^{(a+b)} 2 = \frac{1}{2} \Rightarrow a + \frac{1}{4} = \frac{1}{2} \Rightarrow a = \frac{1}{4}$$

$$\log_{\frac{1}{4}}^{(\frac{1}{4}+\frac{1}{4})} = \log_{\frac{1}{4}}^{(\frac{1}{2})} = \frac{1}{2}$$

۴)

$$\log_{\frac{1}{2}}^{(x^2-x)} 2 = \log_{\frac{1}{2}}^{(x^2-x)} \frac{1}{2} \Rightarrow x^2 - x = \frac{1}{2}$$

$$\Rightarrow 2x^2 - 2x - 1 = 0 \Rightarrow x = \frac{2 \pm \sqrt{4+8}}{4} = \frac{1 \pm \sqrt{3}}{2}$$

$$\Rightarrow x_1 + x_2 = 1$$

$$\Rightarrow x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = 1 + 1 = 2$$

۵)

$$\log_{\frac{1}{2}}^{(x^2-4)} 1 = -\log_2^{(x^2-4)} 1 = 0$$

$$\Rightarrow x^2 - 4 = 1 \Rightarrow x^2 = 5 \Rightarrow x = \pm\sqrt{5}$$

$$\Rightarrow x = -\sqrt{5}$$

۶)

$$\log_{\frac{1}{2}}^{(x^2-x)} 2 = \log_{\frac{1}{2}}^{(x^2-x)} \frac{1}{2} \Rightarrow x^2 - x = \frac{1}{2}$$

$$\Rightarrow 2x^2 - 2x - 1 = 0 \Rightarrow x = \frac{2 \pm \sqrt{4+8}}{4} = \frac{1 \pm \sqrt{3}}{2}$$

$$\Rightarrow x_1 + x_2 = 1$$

$$\Rightarrow x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = 1 + 1 = 2$$

۷)

$$\log_{\frac{1}{2}}^{(x^2-4)} 1 = -\log_2^{(x^2-4)} 1 = 0$$

$$\Rightarrow x^2 - 4 = 1 \Rightarrow x^2 = 5 \Rightarrow x = \pm\sqrt{5}$$

$$\Rightarrow x = -\sqrt{5}$$

۸)

$$\log_{\frac{1}{2}}^{(x^2-x)} 2 = \log_{\frac{1}{2}}^{(x^2-x)} \frac{1}{2} \Rightarrow x^2 - x = \frac{1}{2}$$

$$\Rightarrow 2x^2 - 2x - 1 = 0 \Rightarrow x = \frac{2 \pm \sqrt{4+8}}{4} = \frac{1 \pm \sqrt{3}}{2}$$

$$\Rightarrow x_1 + x_2 = 1$$

$$\Rightarrow x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = 1 + 1 = 2$$

۹)

$$\log_{\frac{1}{2}}^{(x^2-4)} 1 = -\log_2^{(x^2-4)} 1 = 0$$

$$\Rightarrow x^2 - 4 = 1 \Rightarrow x^2 = 5 \Rightarrow x = \pm\sqrt{5}$$

$$\Rightarrow x = -\sqrt{5}$$

۱۰)

$$\log_{\frac{1}{2}}^{(x^2-x)} 2 = \log_{\frac{1}{2}}^{(x^2-x)} \frac{1}{2} \Rightarrow x^2 - x = \frac{1}{2}$$

$$\Rightarrow 2x^2 - 2x - 1 = 0 \Rightarrow x = \frac{2 \pm \sqrt{4+8}}{4} = \frac{1 \pm \sqrt{3}}{2}$$

$$\Rightarrow x_1 + x_2 = 1$$

$$\Rightarrow x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = 1 + 1 = 2$$

۶) $\lim_{x\to 0}\frac{\sin(x^2)}{1-\cos x}=\lim_{x\to 0}\frac{x^2}{\frac{1}{2}x^2}=2$ — $\lim_{x\to 0}\frac{\sin(x^2)}{x^2}\times\frac{x^2}{1-\cos x}$ — $\lim_{x\to 0}\frac{\sin(x^2)}{1-\cos x}$

$\lim_{x\to 0}\frac{\sin(x^2)}{x^2}=1$ — $\lim_{x\to 0}\frac{x^2}{1-\cos x}=\lim_{x\to 0}\frac{x^2}{\frac{1}{2}x^2}=2$

$\lim_{x\to 0}\frac{\sin(x^2)}{1-\cos x}=1\times 2=2$

۷) $\lim_{x\to 0}\frac{\sin x}{x}=1$ — $\lim_{x\to 0}\frac{\sin x}{x}\times\frac{x}{\sin x}=1\times\frac{1}{1}=1$ — $\lim_{x\to 0}\frac{x}{\sin x}=1$

$\lim_{x\to 0}\frac{\sin x}{\sin x}=1$

۸) $\lim_{x\to 0}\frac{\sin x}{x}=1$ — $\lim_{x\to 0}\frac{x}{\sin x}=1$ — $\lim_{x\to 0}\frac{\sin x}{\sin x}=1$

۹) $\lim_{x\to 0}\frac{\sin x}{x}=1$ — $\lim_{x\to 0}\frac{x}{\sin x}=1$ — $\lim_{x\to 0}\frac{\sin x}{\sin x}=1$

۱۰) $\lim_{x\to 0}\frac{\sin x}{x}=1$ — $\lim_{x\to 0}\frac{x}{\sin x}=1$ — $\lim_{x\to 0}\frac{\sin x}{\sin x}=1$

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۱) $\lim_{x\to 0}\frac{\sin x}{x}=1$ — $\lim_{x\to 0}\frac{x}{\sin x}=1$ — $\lim_{x\to 0}\frac{\sin x}{\sin x}=1$

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