1) $\lim\limits_{x\to\infty} \dfrac{x^2 \cdot \cos(2x!)}{x^4+3} = ?$

$-1 \leq \cos(2x!) \leq 1$

∓ 1

$\dfrac{\mp x^2}{x^4\left(1+\frac{3}{x^4}\right)}$

$-x^2 < a < x^2$

$\dfrac{\mp 1}{x^2}$

a) 1   **b) 0**   c) Limit mevcut değildir   d) 1/3   e) 2

2) $f(x) = \sqrt{2 - \sqrt{3 - \sqrt{4-x}}}$ fonksiyonunun tanım kümesi aşağıdakilerden hangisidir?

$3 \geq \sqrt{4-x} \qquad \sqrt{4-x} \leq 3$

$3 - \sqrt{4-x} \geq 0$

$4-x \geq 0 \qquad 4 \geq x \qquad 4-x \leq 9 \qquad -5 \leq x$

$2 - \sqrt{3-\sqrt{4-x}} \geq 0 \qquad 2 \geq \sqrt{3-\sqrt{4-x}}$

a) (3, 4)   b) (-5, 4]   c) [3, 4]   **d) [-5 , 4]**   e) Hiçbiri

$4 \geq 3 - \sqrt{4-x}$

$\sqrt{4-x} \geq -1$

③ $\lim\limits_{x\to 0} \dfrac{x^{2020} \sin 4x}{(\sin x)^{2021}} ?$

$\dfrac{x \cdot x}{\sin x}$

$\dfrac{1}{\sin x} \cdot \sin 4x$

a) 0   b) 2   **c) 4**   d) 2020   e) hiçbiri

④ $\lim\limits_{x\to 1} \dfrac{|x-1|+x}{|x-4|} ?$

$1^+ \qquad \dfrac{(x-1)+x}{4-x} \qquad \left(\dfrac{1}{3}\right)$

$1^- \qquad \dfrac{(1-x)+x}{4-x} \qquad \left(\dfrac{1}{2}\right)$

a) limit mevcut değildir   b) 1/2   **c) 1/3**   d) 1/4   e) 1

⑤ $\lim\limits_{x\to -\infty} \sqrt{4x^2 + 2x} + 2x = ?$

a) 0

b) ∞

c) $-\infty$

d) $\dfrac{1}{2}$

e) $-\dfrac{1}{2}$

$\dfrac{4x^2+2x-4x^2}{\sqrt{4x^2+2x}-2x}$

$\dfrac{2x}{-x\left(\sqrt{4+\frac{2}{x}}+2\right)}$

$\dfrac{\sqrt{x^2\left(4+\frac{2}{x}\right)}-2x}{}$

$-x$

$\dfrac{2x}{-4x} = \dfrac{-1}{2}$

⑥ $\lim\limits_{x\to 0} \dfrac{(\sin x)^{100}}{x^{99} \sin 2x}$ limitinin sonucu aşağıdakilerden hangisidir?

a) 2

b) $\dfrac{1}{2}$

c) 0

d) ∞

$\dfrac{\sin x}{\sin 2x} = \dfrac{1}{2}$

⑦ $\lim\limits_{x\to\infty} x^2 \cdot \left(1 - \cos\dfrac{2}{x}\right) = ?$ 　　a) 0　　b) 1　　c) 2　　d) $\dfrac{1}{2}$

$\infty \cdot (1-1)$　　　$2^{x^{-1}}$

$\dfrac{1-\cos\frac{2}{x}}{\frac{1}{x^2}}$　　$\dfrac{\sin\frac{2}{x} \cdot \frac{-2}{x^2}}{\frac{-2}{x^3}}$　　$\sin\frac{2}{x} \cdot \frac{-2}{x^2} \cdot \frac{x^3}{x}$　　$x \cdot \sin\frac{2}{x}$

x^{-2}

⑧ $\lim\limits_{x\to 0} \dfrac{1-\cos x}{\sin|x| \cdot \tan x} = \dfrac{0}{0} = ?$　　a) 0　　b) 1　　c) $\dfrac{1}{2}$　　d) Limit mevcut değil

0^+　$\dfrac{\sin^2 x}{\frac{\sin x \cdot \sin x}{\cos x}}$　$\dfrac{\cos x}{1+\cos x} = \dfrac{1}{2}$　σ　$\dfrac{\frac{\sin^2 x}{-\sin x \cdot \sin x}}{\cos x}$　$\dfrac{\frac{\sin^2 x}{x}}{\frac{1}{x}}$　$\dfrac{\cos\frac{2}{x} \cdot \frac{-2}{x^2}}{\frac{-1}{x^2}}$　x^{-1}

$\dfrac{-\cos x}{1+\cos x}$　$\dfrac{-1}{2}$　$2\cos\frac{2}{x}$

$\cos\frac{2}{x} \cdot \frac{-2}{x^2} \cdot \frac{x^2}{1}$

⑨ $f(x) = \dfrac{\sqrt{|2x-3|-x}}{x^3-1}$　fonksiyonunun tanım kümesi?

$|2x-3|-x \geq 0$　　$|2x-3| \geq x \Rightarrow$　$2x-3 \leq -x$　　$(-\infty, 1) \cup [3, \infty)$

$2x-3 \geq x$　　　$3x \leq 3$

$x \geq 3$　　　$x \leq 1$

⑩ $\lim\limits_{x\to\infty} \dfrac{x-\sqrt{1+x^2}}{x-\sqrt{x}} = ?$　　$\dfrac{x-\sqrt{x^2(\frac{1}{x^2}+1)}}{x(1-\frac{1}{\sqrt{x}})} = \dfrac{x(1-\sqrt{\frac{1}{x^2}+1})}{x(1-\frac{1}{\sqrt{x}})}$

a) 1　　b) 2　　c) 0　　d) ∞　　e) $-\infty$

⑪ $\lim\limits_{x\to 0} \dfrac{1-\sqrt{1-\sin 2x}}{\tan x} = ?$　　a) 0　　b) 1　　c) 2　　d) ∞

$x - x + \sin 2x$　　$\dfrac{\sin 2x}{\tan x(1+\sqrt{1-\sin 2x})}$　　$\dfrac{\sin 2x \cdot \cos x}{\sin x} \cdot \dfrac{1}{1+\sqrt{1-\sin 2x}}$

$x \cdot 1 \cdot \dfrac{1}{x} = 1$

⑫ $f(x) = \dfrac{\sqrt{|2x+5|-3}}{x^2+1}$　Tanım Kümesi?

$|2x+5|-3 \geq 0$　　$2x+5 \geq 3$

$|2x+5| \geq 3$　　$2x \geq -2$

　　　　　　$x \geq -1$

a) $[-1, \infty) \cup (-\infty, -4]$　$2x+5 \leq -3$　b) $(-1, \infty) \cup (-\infty, -4)$

$2x \leq -8$

c) $(4, \infty) \cup (-\infty, 1)$　$x \leq -4$　d) $[4, \infty) \cup (-\infty, 1]$

⑬ $f(x) = \dfrac{1}{\sqrt{|x|-x}}$　Tanım kümesi?

$\sqrt{|x|-x} > 0$　　　$x > x$　　$x < -x$

$|x|-x > 0$　　　　　　$2x < 0$

a) $(0, \infty)$　b) $(-\infty, 0)$　c) $(1, \infty)$　d) $(-\infty, 1)$

$|x| > x$

⑭ $\lim\limits_{x\to\infty} \left(\sqrt{x^2+x} - \sqrt{x^2-x}\right) = ?$　$\dfrac{x^2+x - x^2 + x}{\sqrt{x^2+x} + \sqrt{x^2-x}}$　$\dfrac{2x}{\sqrt{x^2(1+\frac{1}{x})} + \sqrt{x^2(1-\frac{1}{x})}}$　$\dfrac{2x}{x(\sqrt{1+\frac{1}{x}} + \sqrt{1-\frac{1}{x}})}$

$x\sqrt{1+\frac{1}{x}}$　$x\sqrt{1-\frac{1}{x}}$　x

a) 0　　b) 1　　c) 2　　d) $\dfrac{1}{2}$　　e) -1

(15) $\lim\limits_{x\to 0} \dfrac{\sin x^2}{\sqrt{1+x^2}-1} = ?$ a) 0 b) 1 (c) 2 d) $\frac{1}{2}$ e) -1

$$\dfrac{\sin x^2 \cdot (\sqrt{1+x^2}+1)}{x^2}$$

(16) $\lim\limits_{x\to\infty} x^2 \cdot \sin\frac{1}{x} = ?$ a) 0 b) 1 c) 2 (d) ∞

$$1 \quad \dfrac{\sin\frac{1}{x}}{\frac{1}{x}} \cdot x^2 \cdot \frac{1}{x} \qquad x^2 \cdot \frac{1}{x} = x$$

(17) $\lim\limits_{x\to\infty} \sqrt{x}\cdot \sin\frac{1}{x} = ?$ (a) 0 b) 1 c) 2 d) ∞

$$\dfrac{\sin\frac{1}{x}}{\frac{1}{x}} \cdot \sqrt{x}\cdot\frac{1}{x} \qquad \frac{1}{\sqrt{x}}$$

(18) $\lim\limits_{x\to 0^-} \dfrac{\sqrt{1-\cos 2x}}{\sin 2x} = ?$ a) 0 b) 1 c) $\frac{1}{\sqrt{2}}$ (d) $-\frac{1}{\sqrt{2}}$

$$\sqrt{1-(1-2\sin^2 x)} \qquad \dfrac{-\sqrt{2}\sin x}{2\cdot\sin x\cdot\cos x} \qquad \dfrac{\sqrt{2}}{2\cdot\cos x} \qquad \dfrac{-\sqrt{2}}{2}$$

(19) $\lim\limits_{x\to 1} \dfrac{\sqrt[3]{x}-1}{\sqrt[4]{x}-1} = ?$ a) 0 b) 1 c) $\frac{3}{4}$ (d) $\frac{4}{3}$

$$\dfrac{\frac{1}{3}\cdot x^{-\frac{2}{3}}}{\frac{1}{4}\cdot x^{-\frac{3}{4}}} \qquad \dfrac{1}{3}\cdot 4$$

(20) $\lim\limits_{x\to 3^+} \dfrac{\sin\sqrt{x-3}}{\sqrt{\sin(x-3)}} = ?$ a) 0 (b) 1 c) -1 d) ∞

$$\dfrac{\sin\sqrt{x-3}}{\sqrt{x-3}} \cdot \dfrac{\sqrt{x-3}}{\sqrt{\sin(x-3)}} \quad \to \sqrt{\dfrac{x-3}{\sin(x-3)}} = 1\cdot 1 = 1$$

(21) $\lim\limits_{x\to\infty} \left(x - \dfrac{x^2}{\sqrt{x^2+x}}\right) = ?$ a) 0 b) 1 (c) $\frac{1}{2}$ d) ∞

$$\dfrac{\sqrt{x^4+x^3}-x^2}{\sqrt{x^2+x}}$$

$$\dfrac{x^4+x^3-x^4}{\sqrt{x^2+x}\cdot(\sqrt{x^4+x^3}+x^2)}$$

$$\dfrac{x^3}{x\sqrt{1+\frac{1}{x}}\cdot(x^2\sqrt{1+\frac{1}{x}}+x^2)}$$

$$\dfrac{x^3}{x\sqrt{1+\frac{1}{x}}\cdot(x^2(\sqrt{1+\frac{1}{x}}+1))} \qquad \dfrac{x^3}{x\sqrt{1+\frac{1}{x}}(\sqrt{1+\frac{1}{x}}+1)} \quad 1.2$$

(22) $\lim\limits_{x\to 0} \dfrac{1-\sqrt{1+\sin x}}{1-\sqrt{1-x}} = ?$

$$\dfrac{-\sin x}{x} \cdot \dfrac{(1+\sqrt{1-x})}{(1+\sqrt{1+\sin x})}$$

$$-1\cdot\dfrac{(2)}{2} = -1$$

① $\lim\limits_{x \to \pi} \dfrac{\sin 2x}{x^2 - \pi x} = ?$ a) 0   b) $\dfrac{2}{\pi}$ ⟲   c) ∞ d) 1

$\dfrac{\sin 2x}{x(x-\pi)} = \dfrac{2}{x-\pi}$

$\dfrac{2\cos 2x}{2x - \pi}$ $\dfrac{2}{\pi}$

② $\lim\limits_{x \to -\infty} \left(x^2 + x\sqrt{x^2 - 1} \right) = ?$ a) 0   b) 2   c) $\dfrac{1}{2}$ ⟲   d) $-\dfrac{1}{2}$ e) ∞

$\dfrac{x^4 - x^4 + x^2}{x^2 - x\sqrt{x^2 - 1}} = \dfrac{x^2}{x^2 + x^2\sqrt{1 - \frac{1}{x^2}}}$ $\dfrac{x^2}{x^2\left(1 + \sqrt{1 - \frac{1}{x^2}}\right)}$ $\left(\dfrac{1}{2}\right)$

$x^2\left(1 - \frac{1}{x^2}\right)$

③ Aşağıdaki limitlerden hangilerinin sonucu doğrudur?

I) $\lim\limits_{x \to 1}(x-1)\cdot\sin\dfrac{1}{x-1} = 1$ II) $\lim\limits_{x \to 2}\dfrac{\sin(x-2)}{x^2 - 4} = \dfrac{1}{4}$ ⟲   III) $\lim\limits_{x \to 0}\dfrac{\sin^2 2x}{x^2} = 2$ IV) $\lim\limits_{x \to 0}\dfrac{1 - \cos x}{x^2} = 0$

Yalnız II