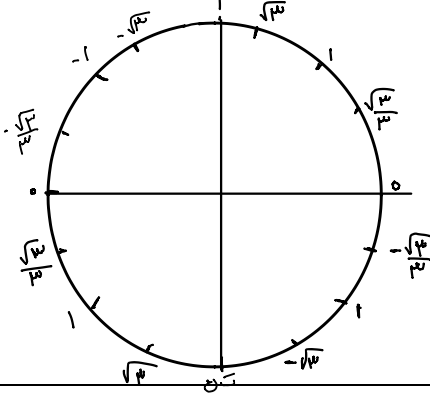


$\frac{\sin}{\cos}$



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الف) $\sin \frac{\pi}{6} + \cos \pi + 2 \tan \frac{\pi}{6} = \frac{1}{2} + (-1) + (-2) = \frac{1}{2} - 3 = \frac{1}{2} - \frac{6}{2} = \frac{-5}{2}$

ب) $-\cos \frac{5\pi}{6} + \sin \frac{\pi}{3} - 2 \sin \frac{\pi}{3} = -(-\frac{\sqrt{3}}{2}) + \frac{\sqrt{3}}{2} - 2(\frac{\sqrt{3}}{2}) = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - \sqrt{3} = \frac{2\sqrt{3}}{2} - \frac{2\sqrt{3}}{2} = \frac{0}{2} = 0$

ج) $\cot \frac{\pi}{3} + 2 \cot \frac{\pi}{3} - 2 \tan \frac{5\pi}{6} = \frac{1}{\sqrt{3}} + 2(\frac{1}{\sqrt{3}}) - 2(-\frac{\sqrt{3}}{3}) = \frac{1}{\sqrt{3}} + \frac{2}{\sqrt{3}} + \frac{2\sqrt{3}}{3} = \frac{3}{\sqrt{3}} + \frac{2\sqrt{3}}{3} = \frac{3\sqrt{3}}{3} + \frac{2\sqrt{3}}{3} = \frac{5\sqrt{3}}{3}$

د) $\cos(\sin \frac{\pi}{6}) + \sin(\pi \cos \frac{\pi}{3}) = \cos 0 + \sin \frac{\pi}{2} = 1 + 1 = 2$

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$f(x) = \begin{cases} x^2 + 4x & x \geq a \rightarrow x=1 \rightarrow 1+4=5 \\ 2x+a+2 & x \leq a \rightarrow x=1 \rightarrow 2+a+2=4+a \end{cases} \rightarrow \text{اگر } f(a) = a+1 \text{ باشد}$

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$f(x) = \begin{cases} 2x^2 - b & |x+1| \geq 2 \rightarrow x \geq 1 \rightarrow 2(1)^2 - b = 11 - b \\ a + 2x & -3 \leq x \leq -1 \rightarrow x = -3 \rightarrow a + 2(-3) = a - 4 \end{cases} \rightarrow a - 4 = 11 - b \rightarrow a + b = 11 + 4 = 15$

$x+1 \geq 2 \rightarrow x \geq 1$

$x+1 \leq -2 \rightarrow x \leq -3$

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الف) $y = \frac{1}{x^3 - 4x^2}$ $x^3 - 4x^2 \neq 0 \rightarrow x^2(x-4) \neq 0 \rightarrow x \neq 0, 4$ $D_f = \mathbb{R} - \{0, 4\}$

ب) $y = \frac{1}{2x^3 + 4x^2 + 2x + 4}$ $D_f = \mathbb{R}$

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الف) $y = \sqrt{x^2 - 1} + \sqrt{x - 2} \rightarrow x^2 - 1 \geq 0 \rightarrow x^2 \geq 1 \rightarrow x \geq 1, x \leq -1$ $x - 2 \geq 0 \rightarrow x \geq 2$ $D_f = (2, +\infty)$ ب) $y = \frac{\sqrt{6-3x}}{\sqrt{6x-3}}$ $4-3x \geq 0 \rightarrow 4 \geq 3x \rightarrow x \leq \frac{4}{3}$ $4x-3 > 0 \rightarrow 4x > 3 \rightarrow x > \frac{3}{4}$ $D_f = (\frac{3}{4}, \frac{4}{3}]$	٦
$y = \sqrt{6x-a} + \sqrt{b-3x}$ $4x-a \geq 0 \rightarrow 4x \geq a \rightarrow x \geq \frac{a}{4}$ $b-3x \geq 0 \rightarrow b \geq 3x \rightarrow \frac{b}{3} \geq x$ $\frac{a}{4} \leq x \leq \frac{b}{3}$ $\frac{a}{4} = 2 \rightarrow a = 8$ $\frac{b}{3} = 2 \rightarrow b = 6$ $\frac{b}{a} = \frac{6}{8} = \frac{3}{4}$	٧
الف) $y = \sqrt{\frac{x^2 - x - 6}{x^2 - 12x + 36}}$ $\rightarrow \sqrt{\frac{(x-3)(x+2)}{(x-6)^2}}$ $x^2 - 12x + 36 = (x-6)^2$ $x^2 - x - 6 = (x-3)(x+2)$ $x \neq 6$ $x \neq -2$ $x \neq 3$ $D_f = (-\infty, -2) \cup (2, +\infty) - \{3\}$ ب) $y = \sqrt{\frac{x^2 - 2x^2 - 5x + 6}{x^2 + 2x^2 - 5x - 6}}$ $\rightarrow \sqrt{\frac{(x-3)(x-1)(x+2)}{(x-2)(x+1)(x+3)}}$ $x \neq 2$ $x \neq -1$ $x \neq -3$ $D_f = (-\infty, -3) \cup [-2, -1) \cup (1, 2) \cup (3, +\infty)$	٨
الف) $y = \sqrt{2[x] - 4}$ $2[x] - 4 \geq 0 \rightarrow [x] \geq 2 \rightarrow [2, +\infty)$ ب) $y = \sqrt{2[x] - 5}$ $2[x] - 5 \geq 0 \rightarrow [x] \geq \frac{5}{2} \rightarrow [3, +\infty)$	٩
الف) $y = \sqrt{\frac{x+1}{ x-3 }} + \sqrt{\frac{6-x}{x^2+2x+4}}$ $\rightarrow [1, 4] - \{3\}$ ب) $y = \sqrt{[x] - 4} + \sqrt{2 - [x]}$ $[x] - 4 \geq 0 \rightarrow [x] \geq 4 \rightarrow [4, +\infty)$ $2 - [x] \geq 0 \rightarrow 2 \geq [x] \rightarrow (-\infty, 2)$ $\left. \begin{matrix} [4, +\infty) \\ (-\infty, 2) \end{matrix} \right\} \cap \rightarrow \emptyset$	١٠