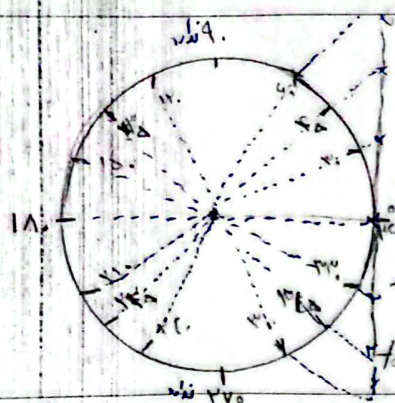




$$\begin{aligned} \tan(0, 0) &= 0 & \tan(120, 2\pi/3) &= -\sqrt{3} \\ \tan(30, \pi/6) &= 1/\sqrt{3} & \tan(150, 5\pi/6) &= -1/\sqrt{3} \\ \tan(45, \pi/4) &= 1 & \tan(225, 5\pi/4) &= 1 \\ \tan(60, \pi/3) &= \sqrt{3} & \tan(300, 5\pi/2) &= -\sqrt{3} \\ \tan(90, \pi/2) &= \text{تصرف نشود} \end{aligned}$$

الف) $\sin \frac{\pi}{6} + \cos \frac{\pi}{6} + 2 \tan \frac{\pi}{6} = \frac{1}{2} + \frac{\sqrt{3}}{2} + 2 \cdot \frac{1}{\sqrt{3}} = \frac{1}{2} + \frac{\sqrt{3}}{2} + \frac{2\sqrt{3}}{2} = \frac{1 + 3\sqrt{3}}{2}$

ب) $-\cos \frac{\pi}{6} + \sin \frac{\pi}{6} - 3 \sin \frac{\pi}{6} = -\frac{\sqrt{3}}{2} + \frac{1}{2} - \frac{3}{2} = \frac{-\sqrt{3} + 1 - 3}{2} = \frac{-\sqrt{3} - 2}{2}$

ج) $\cot \frac{\pi}{6} + 2 \cot \frac{\pi}{6} - 2 \tan \frac{\pi}{6} = \sqrt{3} + 2\sqrt{3} - 2 \cdot \frac{1}{\sqrt{3}} = 3\sqrt{3} - \frac{2}{\sqrt{3}} = \frac{9\sqrt{3} - 2}{\sqrt{3}}$

د) $\cos(\sin \frac{\pi}{6}) + \sin(\pi \cos \frac{\pi}{6}) = \cos(0.5) + \sin(\pi \cdot \frac{\sqrt{3}}{2}) \approx 0.877 + 0.866 = 1.743$

ا) $a^2 + 4a = 2a + a + 2$
 $a^2 + 2a - 2 = 0 \rightarrow (a+2)(a-1)$
 $a = -2$ یا $a = 1$
 $f(1) = 1 + 4 = 5$

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

ج) $11 - b = a - 4$
 $a + b = 15$

الف) $x^3 - 4x^2 \neq 0 \rightarrow x^2(x-4) \neq 0$
 $x \neq 0$ و $x \neq 4$
 $D = \mathbb{R} - \{0, 4\}$

ب) $2x^3 + 4x^2 + 2x + 4 \neq 0$
 $x(2x^2 + 4x + 2) \neq -4$
 $x(x^2 + 2x + 1) \neq -2 \rightarrow x(x+1)^2 \neq -2$ ؟

الف) $x^2 - 1 > 0 \Rightarrow x^2 > 1 \quad x - 2 > 0 \Rightarrow D = (-\infty, -1] \cup [2, +\infty)$
 $\underline{x^2 > 1} \quad \underline{x < -1} \quad \underline{x > 2}$

ب) $x^2 - 3 > 0 \quad x > \frac{1}{x} \quad D = (\frac{1}{x}, +\infty)$

ج) $\frac{1}{a} < \frac{1}{b} \quad 12 - a > 0 \quad b - 9 > 0$
 $12 > a \quad b > 9$

$\frac{b}{a} = \frac{9}{12} = \frac{3}{4}$

د) $\frac{(x-3)(x+2)}{x^2 - 13x + 34} > 0 \Rightarrow x^2 - 13x + 34 > 0 \Rightarrow (x-4)(x-9)$
 $x = \pm 2 \quad x = \pm 3$
 $D = (-\infty, -3) \cup (-2, 2) \cup (3, +\infty)$

هـ) $\frac{(x-1)(x^2 - x - 4)}{(x+1)(x^2 + x - 4)} > 0 \Rightarrow \frac{(x-1)(x-2)(x+2)}{(x+1)(x+4)(x-1)}$
 $D = (-\infty, -4) \cup [-2, -1) \cup [1, 2) \cup [3, +\infty)$

و) $y = \sqrt{2[x] - 4} \quad 2[x] - 4 > 0 \quad D = [2, +\infty)$
 $[x] > 2 \Rightarrow x > 2$

ز) $y = \sqrt{2[x] - 6} \quad [x] > 3 \quad x > 3 \quad D = [3, +\infty)$

الف) $x \neq 3 \quad x^2 + 2x + 4 \rightarrow \text{مربع كامل} \quad D = [-1, 4] - \{3\}$
 $x > -1 \quad x < 4$

ب) $[x] - 4 > 0 \quad 4 - [x] > 0 \quad D = (-\infty, 3) \cup [4, +\infty)$
 $[x] > 4 \quad \underline{x > 4} \quad [x] < 4 \quad \underline{x < 4}$