۱) $-1/2a - b = c$ → A,N۵

$1/2a - b = -b - \frac{3}{2} \rightarrow \boxed{a = 1}$

$-b = \frac{1}{c} \rightarrow \frac{c^2 - 1}{c} = \frac{-3}{2} \rightarrow 2c^2 + 3c - 2 = 0 \rightarrow c^2 + 3c - 4 = 0$

$b + \frac{1}{2} = \frac{-3}{2} \rightarrow \boxed{b = -2}$

$c = \frac{1}{2}$ قبول ✓ — $c = \frac{-4}{2} = -2$ ← غیرقابل

$(1 + \frac{1}{2})x - 2 = \boxed{-3}$

۲) $c \times 3^a = \frac{1}{3}$, $c \times 3^{a+b} = -1$ →

$3^b = 3 \rightarrow \boxed{b = 1}$ ✓

$f(-1) = 1 + \underbrace{c \times 3^a}_{-\frac{1}{3}} \times \left(\frac{1}{3}\right)^1 = \boxed{\frac{8}{9}}$

$\frac{-1}{9}$

۳) $c + \log_5 b = 2$

$c + \log_5^{1.2a+b} = 0$

$\log_5^{\frac{b}{1.2a+b}} = 2 \rightarrow \frac{b}{1.2a+b} = 25 \rightarrow 90a + 25b = b$

$90a = -24b$ ✓

$\boxed{\frac{a}{b} = \frac{-2}{5}} \leftarrow a = \frac{-2}{5}b$ ✓

۴) $|x^2 - 2| - x > 0 \rightarrow |x^2 - 2| > x \rightarrow$

$x^2 - x - 2 > 0$, $x \geq \sqrt{2}$ → $x > 2$ (I) ✓

$x^2 + x - 2 < 0$, $-\sqrt{2} < x < \sqrt{2}$ → $x \in (-\sqrt{2}, 1]$ (II) ✓

$x^2 - x - 2 > 0$, $x < -\sqrt{2}$ (III) ✓

(I) ∪ (II) ∪ (III) = $\boxed{(-\infty, 1) \cup (2, +\infty)}$

۵) $\underbrace{(1,2) \text{ و } (-1,0)}_{\text{در } f(x) \text{ صدق می‌کنند.}} \rightarrow$

$b - a = 1$

$+ \; b + a = 3$

$2b = 4 \rightarrow \boxed{b = 2}$, $\boxed{a = 1}$ ✓ → $\boxed{2 \times 2 - 1 = 3}$ ✓

۶) $\underbrace{(1,0) \text{ و } (2,2)}_{\text{در } f(x) \text{ صدق می‌کنند.}} \rightarrow$

$A + B = -1$

$2A + B = -2$ → $\boxed{A = -1}$, $\boxed{B = 0}$ → $\boxed{f(3) = 9}$ ✓

۷) $x \times \left(\frac{8}{9}\right)^t = \frac{1}{4} \times x \rightarrow t(\log_3^8 - \log_3^9) = (\log_3^1 - \log_3^9)$

$t(3\log_3^2 - 2) = 0 - (1 + \log_3^2)$

$\frac{\log_5^2}{\log_5^3} = \log_3^2 = \frac{5}{12} = \frac{7}{12} \rightarrow t\left(\frac{-1}{6}\right) = \frac{-19}{12} \rightarrow t = \frac{19}{3}\,h$ ✓

$\frac{19}{3} \times 60 = \boxed{380 \text{ min}}$

⑧ $x \times \left(\frac{۷}{۸}\right)^t = \frac{۱}{۷} \times x \rightarrow t\left(\log_۳^۷ - \log_۳^۸\right) = \log_۳^۱ - \log_۳^۷$

$t\left(\frac{۵}{۳} - ۳\left(\frac{۵}{۸}\right)\right) = ۰ - \frac{۶}{۳} \rightarrow t\left(\underbrace{\frac{۵}{۳} - \frac{۱۵}{۸}}_{=\frac{۵}{۲۴}}\right) = -\frac{۵}{۳} \rightarrow \underbrace{t = ۸}_{\text{ثانیه}} \rightarrow ۸ \times ۷ = ۵۶$

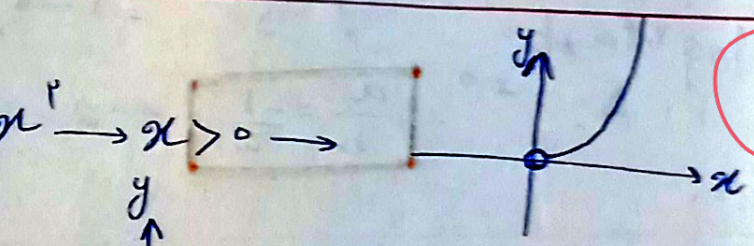
⑨ $x \times \left(\frac{۹۶}{۱۰۰}\right)^t = \frac{۱}{۳} \times x \rightarrow t\left(\log^{۹۶} - \log^{۱۰۰}\right) = -\log^{۳}$

$t\left(۵\log^{۲} + \log^{۳} - ۲\right) = -\log^{۳} \rightarrow t\left(\underbrace{۱/۲ + ۰/۴۸ - ۲}_{-۰/۵۲}\right) = -۰/۴۸$

$t = ۴۶ \text{ ثانیه}$

⑩

الف) $۹^{\log_۳^x} \rightarrow x^{\log_۳^۹} \rightarrow x^۲ \rightarrow x > ۰ \rightarrow$



ب) $\log^{x^۲} \rightarrow ۲\log^x \rightarrow$

$D = \mathbb{R} - \{۰\}$