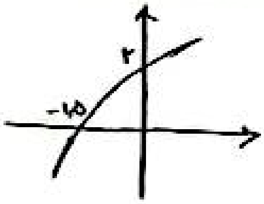
19,5

(1



$y = 1 - \log_c^{(ax-b)}$

$b + c = -\frac{۳}{۲} \rightarrow b = -\frac{۳}{۲} - c$

$1 - \log_c^{-b} = ۲ \rightarrow \log_c^{-b} = -1 \rightarrow \frac{1}{c} = -b \rightarrow \frac{1}{c} = \frac{۳}{۲} + c$

$1 = \frac{۳}{۲}c + c^۲ \rightarrow c^۲ + \frac{۳}{۲}c - 1 = 0$

$\frac{-\frac{۳}{۲} \pm \sqrt{\frac{۹}{۴} + ۴}}{۲}$, $\frac{-\frac{۳}{۲} \pm \frac{۵}{۲}}{۲}$ → $\frac{۲}{۲} \cdot \frac{1}{۲} \rightarrow c = \frac{1}{۲}$; $\frac{-\frac{۳}{۲} - \frac{۵}{۲}}{۲}$ غ ق ق ، $c > 0$

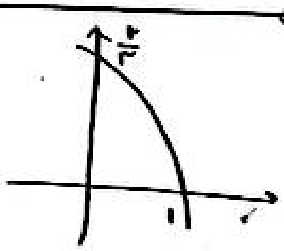
$b = -\frac{۳}{۲} - \frac{1}{۲} = -۲$

$(-1,0)$: $0 = 1 - \log_{\frac{1}{۲}}^{(ax+۲)} \rightarrow \log_{\frac{1}{۲}}^{ax+۲} = 1 \rightarrow \frac{1}{۲} = -1{,}۵a + ۲$

$1{,}۵a = 1{,}۵ \rightarrow a = 1$

$(a + c)b = (1 + \frac{1}{۲})(-۲) = -۳$

(۲



$f(x) = 1 + C \times ۳^{a+bx}$ $f(-1) = ?$

$0 = 1 + C \times ۳^{a+b} \rightarrow 0 = 1 + C \times ۳^a \times ۳^b \rightarrow \frac{1}{۳} \times ۳^b = 1$

$0 = 1 + C \times ۳^{a+1}$ $۳^b = ۳ \rightarrow b = 1$

$\frac{۲}{۳} = 1 + C \times ۳^a \rightarrow C \times ۳^a = -\frac{1}{۳}$

$f(-1) = y = 1 + C \times ۳^{a-1}$

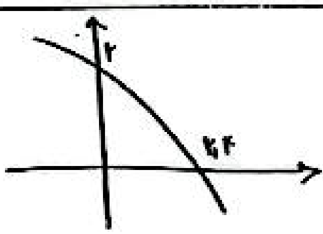
$f(1) = 0 = 1 + C \times ۳^{a+1}$

$\div \rightarrow \frac{-1}{y-1} = \frac{C \times ۳^{a+1}}{C \times ۳^{a-1}} \rightarrow \frac{-1}{y-1} = ۳^۲$

$-1 = ۹y - ۹ \rightarrow y = \frac{۸}{۹}$

$y = f(-1) = \frac{۸}{۹}$

(۳



$y = c + \log_۵^{(ax+b)}$ $\frac{a}{b} = ?$

$\begin{cases} ۲ = c + \log_۵^b \\ 0 = c + \log_۵^{۲,۴a+b} \end{cases}$

$۲ = \log_۵^b - \log_۵^{۲,۴a+b} \rightarrow ۲ = \log_۵^{\frac{b}{۲,۴a+b}}$

$۲۵ = \frac{b}{۲,۴a+b} \rightarrow ۲۵b + ۶۰a = b \rightarrow ۲۴b = -۶۰a \rightarrow \frac{a}{b} = -\frac{۲}{۵}$

(۴

1,5

$f(x) = \log_۲^{(|x^۲-۲|-x)}$

$|x^۲-۲| - x > 0 \rightarrow |x^۲-۲| > x \rightarrow -x > x^۲ - ۲ > x$

→ $x^۲ - ۲ > x \rightarrow x^۲ - x - ۲ > 0 \rightarrow (x-۲)(x+1) > 0$ (−1، ۲: + | − | +)

$(-\infty, -1) \cup (۲, +\infty)$ ①

→ $x^۲ - ۲ < -x \rightarrow x^۲ + x - ۲ < 0 \rightarrow (x+۲)(x-1) < 0$ (−۲، 1: + | − | +)

$(-۲, 1)$ ②

①∩② ~~$(-۲, -1)$~~

$D = (-\infty, 1) \cup (۲, +\infty)$

(5

$f(x) = 2 + 2^{b-ax}$

$g(x) = -x^2 - 3x + 8$

$f^{-1}(10) = -1 \rightarrow f(-1) = 10 \rightarrow 10 = 2 + 2^{b+a}$

$2 + 2^{b-a} = -1 - 3 + 8$

$2^{b-a} = 2 \rightarrow \begin{cases} b - a = 1 \\ b + a = 3 \end{cases} \rightarrow a = 1$

$2b = 4 \rightarrow b = 2$

$2b - a = 4 - 1 = \boxed{3}$

(6

$f(x) = -2 + \left(\frac{1}{2}\right)^{Ax+B}$

$y = x^2 - x$

$0 = -2 + \left(\frac{1}{2}\right)^{A+B} \rightarrow \left(\frac{1}{2}\right)^{A+B} = 2 \rightarrow A + B = -1$

$2 = -2 + \left(\frac{1}{2}\right)^{2A+B} \rightarrow 4 = \left(\frac{1}{2}\right)^{2A+B} \rightarrow 2A + B = -2$

$\begin{cases} 2A + B = -2 \\ A + B = -1 \end{cases}$

$A = -1 \quad , B = 0$

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

$\rightarrow f(3) = -2 + \left(\frac{1}{2}\right)^{-3} = \boxed{6}$

(7

$\log_5 2 = \frac{10}{24} = \frac{5}{12} \qquad \log_5 3 = \frac{10}{14}$

$m(t) = \left(\frac{8}{9}\right)^t \rightarrow \left(\frac{8}{9}\right)^t = \frac{1}{6}$

$\log_5 \left(\frac{8}{9}\right)^t = \log_5 \frac{1}{6} \rightarrow t \log_5 \frac{8}{9} = \log_5 \frac{1}{6} \rightarrow t(3\log_5 2 - \log_5 9) = -\log_5 6$

$t\left(\frac{5}{4} - \left(2\left(\frac{10}{14}\right)\right)\right) = -\left(\frac{5}{12} + \frac{10}{14}\right)$

$\frac{70 + 120}{168} = \frac{190}{168}$

$t\left(\frac{5}{4} - \frac{10}{7}\right) = -\frac{190}{168} \rightarrow t\left(-\frac{5}{28}\right) = -\frac{190}{168} \rightarrow t = \frac{38}{6} h \xrightarrow{\times 60}$

$\frac{35 - 40}{28} = -\frac{5}{28}$

$\frac{38}{6} \times 60 = \boxed{380 \text{ min}}$

(8

$m(t) = \left(\frac{87.5}{100}\right)^t \rightarrow \left(\frac{7}{8}\right)^t = \frac{1}{7}$

$\log_7 3 = 0.6 \rightarrow \log_3 7 = \frac{5}{3}$

$\log_2 3 = 1.6 \rightarrow \log_3 2 = \frac{5}{8}$

$\log_3 \left(\frac{7}{8}\right)^t = \log_3 \frac{1}{7} \rightarrow t(\log_3 7 - 3\log_3 2) = \log_3 1 - \log_3 7$

$t\left(\frac{5}{3} - \frac{15}{8}\right) = 0 - \frac{5}{3} \rightarrow -\frac{5}{24} t = -\frac{5}{3} \rightarrow t = 8 \xrightarrow{\times 7} \boxed{56}$

$\frac{40 - 45}{24}$

(9

$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$

$m(t) = \left(\frac{96}{100}\right)^t \rightarrow \left(\frac{96}{100}\right)^t = \frac{1}{2} \rightarrow \log\left(\frac{96}{100}\right)^t = \log\frac{1}{2}$

$t(\log 96 - \log 100) = \log 1 - \log 2$

$t(1.5 + 0.48 - 2) = -0.48 \rightarrow \boxed{t = 24}$

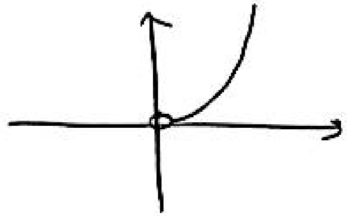
-0.02

(۱۰

9

الف) $y = 9^{\log_3 x} \Longrightarrow x^{\log_3 9} = x^2$

$x > 0$



ب) $y = \log x^2 = 2\log x$

$x^2 > 0 \rightarrow D = R$