(8)

$$\left(\frac{4}{10}\right)^{2x-1} = \left(\frac{5^3}{2^3}\right)^{x^2} \Rightarrow \left(\frac{2}{5}\right)^{2x-1} \longrightarrow \left(\frac{5}{2}\right)^{3x^2} \longrightarrow 2x-1 = -3x^2$$

$$3x^2+2x-1=0 \to \left(x+\frac{3}{3}\right)\left(x-\frac{1}{3}\right)=0 \longrightarrow x=-1$$ غ ق ق $$9x+1=-8 \times$$ (2)

$$\hookrightarrow x=\frac{1}{3} \to \log_{2^3}(3+1) = \log_{2^3} 2^2 = \frac{2}{3}\log_2 2 = \boxed{\frac{2}{3}}$$

$$\frac{1}{3}\log_2 b = \frac{2}{3}(a+1) \longrightarrow \log_2 b = 2a+2 \qquad 2^{(2a+2)} = b \longrightarrow (2^a)^2 \times 4 = 36 \to b=36$$ (9)

$$\log(3b-8) \to \log(100) = \boxed{2}$$ (2)

$$S = \frac{-b}{-4a} \to \frac{b}{4a} = \log 4 \to \frac{a}{b} = \frac{\log 4}{4} = \frac{2\log 2}{4} = \frac{\log 2}{2}$$

$$2a = b+c \to 2\frac{a}{b} = 1+\frac{c}{b} \xrightarrow{\frac{a}{b}=\frac{\log 2}{2}} 2\left(\frac{\log 2}{2}\right) = 1+\frac{c}{b}$$ (4)

$$\frac{c}{b} = -1+\log 2 \longrightarrow \frac{c}{a} = \frac{-1+\log 2}{\frac{\log 2}{2}} \Rightarrow \frac{c}{a} = \frac{\log 2 - \log 10}{\frac{1}{2}\log 2} = \frac{\log \frac{2}{10}}{\frac{1}{2}\log 2} = \frac{\log\frac{1}{5}}{\frac{1}{2}\log 2}$$

$$\frac{\log\frac{1}{5}}{\log\sqrt{2}} = \log_{\sqrt{2}}\frac{1}{5} \to \left(\frac{1}{\sqrt{2}}\right)^{\frac{c}{a}} \Rightarrow \left(\frac{1}{5}\right)^{\log_{\sqrt{2}}\frac{1}{\sqrt{2}}} = \left(\frac{1}{5}\right)^{\log_{\frac{1}{2}} 2^{-\frac{1}{8}}} = \frac{1}{5}\left(\frac{\frac{-1}{8}}{\frac{1}{2}}\right)\log_2 2 = \boxed{\sqrt[4]{5}}$$