Quiz 8 Practice: Solutions

① $\frac{\ln(40)}{\ln(2)}$ or $\frac{\log(40)}{\log(2)}$

② $\frac{\ln(600)}{\ln(1.05)} = \frac{\log(600)}{\log(1.05)}$

③ $\frac{\ln(9)}{\ln(1/2)} = \frac{\log(9)}{\log(1/2)}$

Note: you could continue this as $\frac{\ln(9)}{\ln(2^{-1})} = -\frac{\ln(9)}{\ln(2)}$ and some people who write tests, will.

④ $e^{4x} = 9$ Cancel "e" with ln( ).

$\ln(e^{4x}) = \ln(9)$

$4x = \ln(9) \longrightarrow \boxed{x = \frac{\ln(9)}{4}} = \frac{2\ln(3)}{4} = \frac{\ln(3)}{2}$

⑤ $3 + 2^x = 7$

$2^x = 4$ Cancel "2" with $\log_2( )$

$\log_2(2^x) = \log_2(4)$

$x = \ln(4)/\ln(2)$

$\boxed{x = 2}$

1st task: Get the exponential expression alone!

⑥ $9 \cdot 10^{x/4} = 300$

$10^{x/4} = 300/9$ Cancel "10" with "log( )"

$\log(10^{x/4}) = \log(300/9)$

$\frac{x}{4} = \log\left(\frac{300}{9}\right)$ ← this is good enough for calculator

$\boxed{x = 4\log\left(\frac{300}{9}\right)} = 4\log\left(\frac{100}{3}\right) = 4[\log(100) - \log(3)]$

$= 4(2 - \log(3))$

Maybe bonus points?

~~$x = 4(\log(300) - \log(9))$~~

(7) $1+3e^{2x}=100$

$3e^{2x}=99$

$e^{2x}=33$

$2x=\ln(33)$

$x=\ln(33)/2$

(8) $6-4^{-x}=1$

$-4^{-x}=-5$ (Divide by -1)

$4^{-x}=5$

$\log_4 4^{-x}=\log_4 5$ ($\log_4()$ cancels 4)

$-x=\frac{\ln(5)}{\ln(4)} \rightarrow \boxed{x=-\frac{\ln(5)}{\ln(4)}}$

(9) $y=3+2e^{x}$

$x=3+2e^{y}$

$x-3=2e^{y}$

$\frac{x-3}{2}=e^{y}$

$\boxed{\ln\left(\frac{x-3}{2}\right)=y}$

(10) $y=600(1/2)^{x/5}$

$x=600(1/2)^{y/5}$

$\frac{x}{600}=\left(\frac{1}{2}\right)^{y/5}=2^{-y/5}$ because $\frac{1}{2}=2^{-1}$

$\left(\frac{1}{2}\right)^{y/5}=\frac{x}{600}$

could continue from here.

Cancelled with $\log_{1/2}()$

$y/5=\log_{1/2}\left(\frac{x}{600}\right)$

$\boxed{y=5\log_{1/2}\left(\frac{x}{600}\right)}$

(11) $y=2-\log_{\text{base }10}(x-1)$

algebra! $x=2-\log(y-1)$

$\log(y-1)+x=2$

$\log(y-1)=2-x$

$y-1=10^{2-x}$

$\boxed{y=1+10^{2-x}}$

(12) $y=\frac{1}{5}\log_2(3x)$

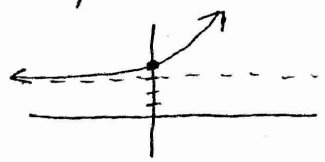
$x=\frac{1}{5}\log_2(3y)$

$5x=\log_2(3y)$

$3y=2^{5x}$ Use definition

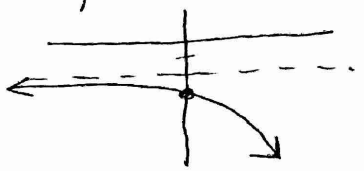
$\boxed{y=\frac{1}{3}2^{5x}}$

(13) $y = 3 + 2^x$



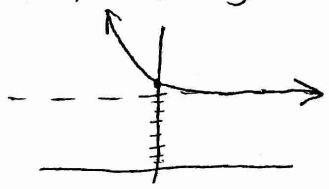
asymptote : $y = 3$
left : $y \to 3$
right : $y \to \infty$

(14) $y = -2 - 5^x$



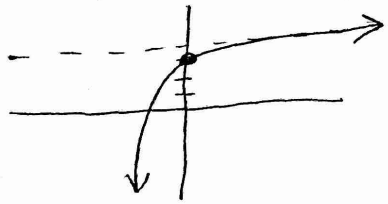
asymptote : $y = -2$
Left : $y \to -2$
right : $y \to -\infty$

(15) $y = 8 + 3^{-x}$



asymptote : $y = 8$
left : $y \to \infty$
right : $y \to 8$

(16) $y = 4 - e^{-2x}$



asymptote : $y = 4$
left : $y \to -\infty$
right : $y \to 4$

(17) Asymptote : $x = -7$
Domain : $x + 7 > 0$
$\boxed{x > -7}$

(18) Asymptote : $x = \frac{3}{2}$
Domain : $2x - 3 > 0$
$2x > 3$
$\boxed{x > 3/2}$

(19) Asymptote : $x = -10$
Domain : $\frac{1}{2}x + 5 > 10$
$\frac{1}{2}x > -5$
$\boxed{x > -10}$

(20) Asymptote : $x = 9$
Domain : $9 - x > 0$
$-x > -9$
$\boxed{x < 9}$