Practice test Solutions:

① $\sqrt{64x^{16}y^4} = (64x^{16}y^4)^{1/2} = 8x^8y^2$

$\sqrt{n} = n^{1/2}$

$(n^a)^b = n^{ab}$

② All you can do here is write $(x^3+3x^2+3^x+1)^{1/3}$

③ $(\sqrt{2x^2})^4 = [(2x^2)^{1/2}]^4 = (2^{1/2}x^1)^4 = 2^2x^4 = 4x^4$

④ $\sqrt[3]{125x^3y^6z^9} = (125x^3y^6z^9)^{1/3} = 5x^1y^2z^3 = 5xy^2z^3$

⑤ $\sqrt{4x^4} = (4x^4)^{1/2} = 2x^2$

⑥ $17^m = 6 \rightarrow \log_{17}17^m = \log_{17}6 \rightarrow m = \frac{\log 6}{\log 17}$

⑦ $\log_6 40 = \frac{\log_{10}(40)}{\log_{10}(6)}$ (change of base)

⑧ $\log_{21}5 + \log_{21}4 - \log_{21}2 = \log_{21}\left(\frac{5\cdot4}{2}\right) = \log_{21}10$

⑨ $\log x + \log y - k\log r = \log xy - \log r^k = \log\left(\frac{xy}{r^k}\right)$

⑩ $3\log x + \log 2 = \log 3x - \log 2$

$\log x^3 + \log 2 = \log\left(\frac{3x}{2}\right)$

$\log(2x^3) = \log\left(\frac{3x}{2}\right)$

⑪ $y = 4(1.6)^x$

$12 = 4(1.6)^x$

$3 = 1.6^x$

$\log_{1.6}(3) = x \rightarrow x = \ln(3)/\ln(1.6)$

use calculator

⑫ $6^{3x} = 30$

$3x = \log_6 30$

$x = \frac{\log_6 30}{3} = \frac{1}{3}\cdot\frac{\ln 30}{\ln 6} = \frac{\ln 30}{3\ln 6}$

(13) $5^x = 17 \rightarrow \log_5 17 = x \longrightarrow x = \log(17)/\log(5)$

(14) $100^{x+6} = 1000^{2x+3}$

$(10^2)^{x+6} = (10^3)^{2x+3} \longrightarrow 10^{2x+12} = 10^{6x+9}$ Use log on both sides.

$2x+12 = 6x+9$

$2x+3 = 6x$

$3 = 4x \rightarrow x = 3/4$

(15) Solve this one by graphing.

$Y_1 = 3^{x-1}$

$Y_2 = 4^{2x+5}$

use 2nd, calc, intersect.

$x \approx -4.797$

(16) $y = \log(5x+3)$

$10^y = 5x+3$

$10^y - 3 = 5x$

$x = \frac{1}{5}(10^y - 3)$

(17) $\log_x y = 2 \rightarrow x^2 = y$

(18) $\log_3 27 = \log 3^3 = 3$

(19) $\log 72 = \log 36 + \log 2$

$= 2\log 6 + \log 2$

$= 2(\log 3 + \log 2) + \log 2$

$= 2\log 3 + 2\log 2 + \log 2$

$= 2\log 3 + 3\log 2$

$= 2(.477) + 3(.301)$

$\approx 1 + 0.9 \approx 1.9$

(20) $\log_{.5} 32 = x$

$.5^x = 32$

$(\frac{1}{2})^x = 32$

$(2^{-1})^x = 2^5$

$2^{-x} = 2^5$

$-x = 5$

$x = -5$

(21) When $x \rightarrow x+1$, $y \rightarrow 5y$, $b = 5$

Contains $(0,3)$ so $a = 3$

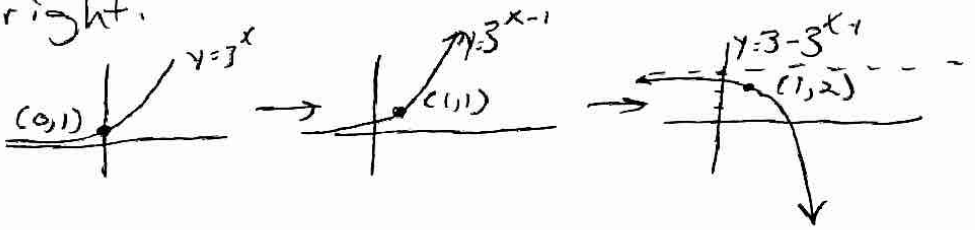
$y = 3 \cdot 5^x$

(22)

x	1	2	3	4	5	6
y	7	14	29	60	123	250
	+7	+15	+31	+63	+127	

This is almost doubling each time. It's exponential.

(23) It has (1,2) instead of (0,2) so it's shifted to the right.



(24) $(0,2) \rightarrow a=2$
$(1,3) \rightarrow b=3/2$
$\rightarrow y=2\left(\frac{3}{2}\right)^x$

(25) The e^x part is untransformed except for down-shift by 2.
$y=-2+e^x=e^x-2$

(26) starting value $a=100$
change rate $=-50\%=-1/2$
$b=1+(-1/2)=0.5$

(27) Start at 100, doubling
$y=100\cdot 2^x$

(28) $y=5000\cdot 3^{t/43}$
(start value, tripling, tripling time)

(29) $a=500$, $r=\frac{10}{100}=0.1$
$b=1.1$
$y=500(1.1)^x \rightarrow x=4$
$y=500(1.1)^4$

(30) change rate $r=\frac{100}{2000}=0.05$
$y=2000(1+0.05)^t$

(31) continue the curve watch how it flattens out. should be about 130.

(32) $18000(1-.16)^t = 12000$

$(0.84)^t = \frac{12}{18} = \frac{2}{3} \rightarrow t = \log_{.84}(2/3) = \frac{\ln(2/3)}{\ln(.84)}$ Use calculator

(33) $6 \cdot 2^x = 96$

$2^x = \frac{96}{6} = 16$

$x = 4$

(34) $5.0 = -\log(t)$

$-5.0 = \log(t)$

$t = 10^{-5} = 0.00001$

(35) $A = P(1 + \frac{r}{n})^{nt}$ ← going by quarters makes 4 times as many periods.

↑ cut the effective interest by 4 : $n = 4$

$8000 = P(1 + \frac{.0325}{4})^{(4)(5)} \rightarrow P = \frac{8000}{(1 + \frac{.0325}{4})^{20}}$

(36) $\log_3(\frac{1}{9}) = x \rightarrow 3^x = \frac{1}{9}$

(37) Step 3. It looks like they did the cancellation wrong.

(38) N increases

$-N$ decreases

$(1+r)^N$ decreases

$1-(1+r)^{-N}$ increases

(39) $y = \ln(x-15)+3$

$x = \ln(y-15)+3$

$x-3 = \ln(y-15)$

$e^{x-3} = y-15$

$15+e^{x-3} = y$

(40) The coefficient $a = 500$