Bell work 2.19

Evaluate each binomial

1) $\log_{12} 144$

$\frac{\log 144}{\log 12}$

2

(2) $\log_4 64$

$\frac{\log 64}{\log 4}$

3

(3) $\log_{64} 4$

$\frac{\log 4}{\log 64}$

0.3333 or $\frac{1}{3}$

Solve each equation.

1) $8^{2x} = 32$

$\log 8^{2x} = \log 32$

$2x \log 8 = \log 32$

$2x = \frac{\log 32}{\log 8}$

$2x = 1.6667$

$x = 0.8333$

2) $9^{2x} = 27$

$\log 9^{2x} = \log 27$

$2x \log 9 = \log 27$

$2x = \frac{\log 27}{\log 9}$

$2x = 1.5$

$x = 0.75$

3) $36^{-2x+1} = 216$

$-2x+1 \log 36 = \log 216$

$-2x+1 = \frac{\log 216}{\log 36}$

$-2x+1 = 1.5$

$-2x = 0.5$

$x = -0.25$

Solve each equation. Round answers to the nearest hundredth.

4) $5^{2x} = 20$

$2x \log 5 = \log 20$

$2x = \frac{\log 20}{\log 5}$

$x = 0.93$

5) $4^{n-2} = 3$

$n-2 \log 4 = \log 3$

$n-2 = \frac{\log 3}{\log 4}$

$n = 2.79$

6) $15^{2n-3} = 245$

$2n-3 \log 15 = \log 245$

$2n-3 = \frac{\log 245}{\log 15}$

$2n-3 = 2.0314$

$n = 2.52$

Solve each equation. Check your answers.

7) $\log x = 2$

$\log_{10} x = 2$

$x = 10^2$

$x = 100$

8) $\log 3x = 2$

$3x = 10^2$

$\frac{3x}{3} = \frac{100}{3}$

$x = \frac{100}{3}$

9) $4 \log x = 4$

$\frac{4}{4} \quad \frac{4}{4}$

$\log x = 1$

$x = 10^1$

$x = 10$

10) $2 \log x = 2$

$\log x = 1$

$x = 10^1$

$x = 10$

11) $\log (3x - 2) = 3$

$3x - 2 = 10^3$

$3x - 2 = 1000$

$3x = 1002$

$x = 334$

12) $2 \log (2x + 5) = 4$

$\log (2x + 5) = 2$

$2x + 5 = 10^2$

$2x + 5 = 100$

$2x = 95$

$x = 47.5$

13) Suppose you deposit $2500 in a savings account that pays you 5% interest per year.

a. How many years will it take for you to double your money?

b. How many years will it take for your account to reach $8,000?

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

$1 + \frac{.05}{1}$

$5000 = 2500(1.05)^t$

$2 = 1.05^t$

$\log_{1.05} 2 = t$

$\frac{\log 2}{\log 1.05} = t$

$t = 14.2$ yrs

P = Principle

5000 = A = Amount

r = rate = .05

1 = n = number of times interest is compounded

t = time

b) $8000 = 2500(1.05)^t$

$3.2 = 1.05^t$

$\frac{\log 3.2}{\log 1.05} = 23.8$ yrs

14)

$$\begin{cases} 3^{2x-y} = 1 \\ 4^{x+y} - 8 = 0 \end{cases}$$

$3^{2x-y} = 1$

$\log_3 1 = 2x - y$

$\frac{\log 1}{\log 3} = 2x - y$

$0 = 2x - y$

$y = 2x$

$y = 1$

$4^{x+y} - 8 = 0$

$4^{x+y} = 8$

$\log_4 8 = x + y$

$\frac{\log 8}{\log 4} = x + y$

$1.5 = x + 2x$

$1.5 = 3x$

$x = 0.5$