

SHOW ALL WORK AND ANSWERS ON SEPARATE PAPER.

NON-CALCULATOR PARTFind the value of  $x$ .

$$\log_b y = x \Rightarrow b^x = y$$

1.  $\log_{15} 15 = x$
2.  $\log_4 x = 3$
3.  $\log_x \frac{1}{16} = -2$
4.  $\log_{49} x = 1$
5.  $\log_{144} x = \frac{1}{2}$
6.  $\log_x 81 = 4$

Expand each expression.

7.  $\log_2 \frac{y}{5}$
8.  $\ln 4x^2$
9.  $\log_7 \frac{1}{2} ab^3$
10.  $\ln \frac{2}{c^2 d}$

Condense each expression.

11.  $\log_3 8 - \log_3 x$
12.  $\ln 4 + 2 \ln g - 3 \ln h$
13.  $2 \log_5 2 + \frac{1}{2} \log_5 z$

Evaluate each expression.

14.  $5^{\log_5 19} \log_4 4^3$
15.  $\ln e^7 - 2e^{\ln 4}$
16.  $\log_6 36 + \log_2 \frac{1}{2}$

\*  
rewrite

Cancel when necessary!!

exponents  
last!!  
≡exponents  
first!!  
≡

put the number back in to see if there are no negatives inside

Solve each equation. Check for extraneous solutions.

\* Set parenthesis equal to each other & solve the equation

17.  $\log_5(6 - 2x) = \log_5(x - 6)$

\* 18.  $\log_3(x^2 - 12) = \log_3 4x$  sum/product

Solve each equation.

get common bases & then set exponents equal to each other & solve

19.  $10^{4x+1} = 1000^{x+2}$

20.  $(\frac{1}{4})^{x+7} = 4^{2x}$

21.  $2^x + 6 = 38$

CALCULATOR PART

8.5

Use the change of base formula to rewrite each expression. Then use a calculator to evaluate the expression. Round to three decimal places.

- 22.  $\log_{18} 29$
- 23.  $\log_{1/2} 22$
- 24.  $\log_{35} 5$

$$\log_b a = \frac{\log a}{\log b}$$

Solve each equation.

log of both sides

25.  $12^x = 33$

26.  $5^{0.2x} - 3 = 27$

27.  $18 \ln x = 36$

28.  $\ln(x + 4) = 9$

} e to both sides

Use the formula  $N(t) = N_0 e^{-0.00012t}$  to solve.

29. A plank of wood is found at an ancient city in an archeological dig. If the original amount of carbon-14 was 600 grams and the amount present now is 570 grams, how old is the plank of wood?

$N_0$

$N(t)$

30. A pair of antlers is found in the woods and contains 90% of its original amount of carbon-14. Estimate the age of the pair of antlers.

$$0.90 N_0 = N_0 e^{-0.00012t}$$