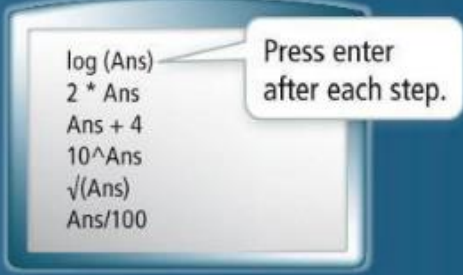


Aim: What are the properties of logarithms? (Section 7.4)

Do Now:

Write a positive number on a piece of paper. Key this number into your calculator and press **enter**. Then perform the steps shown here. Press **enter** after each line. Do you recognize the number that results? Explain why this result makes sense.



I – Properties of Logarithms

Properties of Logarithms		
Product Property	Quotient Property	Power Property
$\log_b mn = \log_b m + \log_b n$	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_b m^n = n \log_b m$

Write each expression as a single logarithm.

1. $\log_3 9 + \log_3 24$

2. $\log_4 16^3$

3. $\log_2 7 - \log_2 9$

4. $\log_3 8^5$

5. $\log_4 x - \log_4 y$

6. $\log 5 + \log 7$

Expand each logarithm. Simplify if possible.

7. $\log_3 27x$

8. $\log \frac{3}{7}$

9. $\log_4 y^2 z^3$

10. $\log_5 \frac{3^2}{x}$

11. $\log_3 15xy$

12. $\log 8xz^4$

Aim: What are the properties of logarithms? (Section 7.4)

II – Change of base formula

Change of Base FormulaFor any positive numbers m , b , and c , with $b \neq 1$ and $c \neq 1$,

$$\log_b m = \frac{\log_c m}{\log_c b}$$

1- Prove why it works?

2- Use the Change of Base Formula to evaluate each expression.

14. $\log_{32} 4$

15. $\log_9 27$

16. $\log_4 12$

$$\frac{\log_2 4}{\log_2 32} =$$

17. Prove why the “Do Now” problem works