

10.2 Logarithm Basics

Warm-Up Monday

Turn in your 10.1 assignment if you haven't already, then post on the padlet (link below)



<https://padlet.com/Korotkow/prom2k18>

10.2 Logarithm Basics

Essential
Question:

How do I convert an exponential equation to log form?

Log Rules

$$\log_B A = x$$

B → base

A → argument

x → exponent

log x

no base →
Base 10

ln x "natural log"

$\log_e x$

$e \approx 2.71 \dots$

$$\log_B A = x$$

exponential form:

$$B^x = A$$

10.2 Logarithm Basics

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Rewrite as an exponential equation

$$\log_3 9 = 2$$

$$3^2 = 9$$

$$\log 1000 = 3$$

$$10^3 = 1000$$

$$\ln 3 = 1.1$$

$$e^{1.1} = 3$$

Rewrite as a logarithmic equation

$$2^5 = 32$$

$$\log_2 32 = 5$$

$$10^2 = 100$$

$$\log_{10} 100 = 2$$

OR

$$\log 100 = 2$$

$$e^5 = 148.4$$

$$\log_e 148.4 = 5$$

OR

$$\ln 148.4 = 5$$

10.2 Logarithm Basics

Essential Question: How do I convert an exponential equation to log form?

Evaluating Logs

$$\log_x 16 = 2$$

$$x^2 = 16$$

$$x = 4$$

$$\log_3 27 = x$$

$$3^x = 27$$

$$x = 3$$

$$\ln e^3 = x$$

$$e^x = e^3$$

$$x = 3$$

$$\log_3 x = -2$$

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

$$\frac{1}{3^2} = x$$

$$\frac{1}{9} = x$$

$$\log 10,000 = x$$

$$10^x = 10,000$$

$$x = 4$$

$$\ln e = \log_e e = x$$

$$e^x = e$$

$$x = 1$$

$$\log_{81} x = \frac{1}{2}$$

$$81^{1/2} = x$$

$$\sqrt{81} = x$$

$$9 = x$$

$$\log_9 27 = x$$

$$9^x = 27$$

$$(3^2)^x = 3^3$$

$$2x = \frac{3}{2}$$

$$\ln 1 = \log_e 1 = x$$

$$e^x = 1$$

Same base
on both
sides

$$x = 3/2$$

$$x = 0$$

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Exit Ticket on google classroom

10.2 – Logarithms

Name _____

Express in exponential form.

1. $\log_2 16 = 4$

2. $\ln 1 = 0$

3. $\log_3 27 = -3$

4. $\log_{\frac{1}{2}} 4 = 2$

5. $\log \frac{1}{10} = -1$

6. $\log 1000 = 3$

7. $\log_2 \frac{1}{8} = -3$

8. $\log_8 64 = 2$

Express in logarithmic form.

9. $2^3 = 8$

10. $10^{-2} = \frac{1}{100}$

11. $e^0 = 1$

12. $2^{10} = 1024$

13. $4^{\frac{1}{2}} = 2$

14. $27^{\frac{1}{3}} = 3$

15. $625^{\frac{3}{4}} = 125$

16. $4^{-\frac{3}{2}} = \frac{1}{8}$

Evaluate without a calculator.

17. $\log 10,000$

18. $\log_2 32$

19. $\log_3 27$

20. $\log 10$

21. $\log \frac{1}{100,000}$

22. $\log_2 \frac{1}{4}$

23. $\log_3 1$

24. $\log_3 \frac{1}{9}$

Evaluate without a calculator.

25. $\log_{\frac{1}{3}} 27$

26. $\log_{\frac{1}{2}} 8$

27. $\log_{27} 81$

28. $\log_8 32$

29. $\log_{\sqrt{2}} 16$

30. $\log \sqrt{10}$

31. $\log_{\frac{1}{3}} 81$

32. $\log_{\frac{1}{2}} \frac{1}{16}$

 Use your calculator and one of the change of base formulas to estimate. Round to 2 places.

33. $\log_2 1$

$\log_2 \frac{1}{2}$

$\log_7 5$

$\log_5 7$

37. $\log_{500} 1000$

38. $\log_{500} 250$

39. $\log_{12} \frac{7}{56}$

omit
exit ticket!!

10.2 Logarithm Basics

Warm-Up Wednesday

1. For all real numbers x and y , which of the following is always true?

~~A.~~ $(2x)^3 = 6x^3$ $2^3 = 8$

~~B.~~ $(x^2y^3)^6 = x^8y^9$ $(x^2)^6 (y^3)^6$

~~C.~~ $(5x^2)(y^2) = (5xy)^2$ $25x^2y^2$

D. $(x^2y^4)^0 = 1$ ✓

2. Simplify the expression

$(25a^{-4}b^{16})^{1/2}$

$25^{1/2} (a^{-4})^{1/2} (b^{16})^{1/2}$

$5 \sqrt{a^{-2}} b^8$

$= \frac{5b^8}{a^2}$

About Me



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