

# 10.6 Solving Logs w/ calculator

Warm-Up Wednesday

Solve without a calculator (leave answers exact)

1.  $4^x = 7$

$$\boxed{\log_4 7 = x}$$

2.  $\log x + \log(x-9) = 1$

$$\log_{10}(x(x-9)) = 1$$

$$10^1 = x^2 - 9x$$

$$0 = x^2 - 9x - 10$$

$$0 = (x-10)(x+1)$$

$$x-10=0$$

$$x+1=0$$

About Me

1. What famous person do you think you most look like?
2. Would you rather find the love of your life at 50, or someone decent at 25?

# 10.6 Solving Logs w/ calculator

EQ: How do I find approximate answers to log equations?

1.  $5^x = 9$

$$\log_5 9 = x$$

Round to 3 decimals  
\* if cannot get same base, convert to log

NORMAL FLOAT AUTO REAL DEGREE MP   
 $\log_5(9)$   
.....1.365212389

1.365

# 10.6 Solving Logs w/ calculator

EQ: How do I find approximate answers to log equations?

2.  $\ln x = -\frac{1}{2}$

$$\log_e x = -\frac{1}{2}$$

$$e^{-1/2} = x$$

$e \rightarrow$  2nd ÷  
2nd ln

\* convert to exponential

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$\log_5(9)$

1.365212389

$e^{-1/2}$

0.6065306597



$$x = .607$$

# 10.6 Solving Logs w/ calculator

EQ: How do I find approximate answers to log equations?

3.  $5^{x-1} = 7^{x+2}$

\* not same base  
w/ exponents on  
diff. sides →

$$\log 5^{x-1} = \log 7^{x+2}$$

$$(x-1) \log 5 = (x+2) \log 7$$

$$\log 5(x-1) = \log 7(x+2)$$

take log of both  
sides

$$\begin{array}{rcl} x \log 5 - \log 5 & = & x \log 7 + 2 \log 7 \\ -x \log 7 + \log 5 & & -x \log 7 + \log 5 \end{array}$$

$$x \log 5 - x \log 7 = 2 \log 7 + \log 5$$

$$\frac{x(\log 5 - \log 7)}{(\log 5 - \log 7)} = \frac{2 \log 7 + \log 5}{\log 5 - \log 7}$$

\* x's on  
one side  
\* #'s on  
other

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$\log_5(9)$	1.365212389
$e^{-1/2}$	0.6065306597
$(2 \log(7) + \log(5)) / (\log(5) - \log(7))$	16.34981318
	<b>-16.350</b>

# 10.6 Solving Logs w/ calculator

EQ: How do I find approximate answers to log equations?

4.

$$\ln x = \ln 4^x + \ln 6^{x-9}$$
$$\ln x = \ln(4 \cdot 6)$$

$$x = 24$$

\* condense logs first

\* Argument of log can never be negative.

## 10.6 Logarithmic Equations With a Calculator

EVENS 😊

Name \_\_\_\_\_

Solve each equation for x. Round your answer to the nearest thousandth.

1.  $2^x = 10$

2.  $4^x = 7$

3.  $e^x = 1$

4.  $e^{2x} = 4$

5.  $e^{\frac{1}{2}x} = 6$

6.  $e^x = 2$

7.  $\ln x = 1$

8.  $\ln x = \sqrt{3}$

9.  $\ln x = -5$

10.  $\ln x = \ln 2 - \ln 5$

11.  $\ln x = \ln e^2 - 1$

12.  $4e^{5x} + 6 = 134$

$$\begin{aligned} & -6 -6 \\ & \frac{4e^{5x}}{4} = \frac{128}{4} \\ & e^{5x} = 32 \\ & \log_e 32 = \frac{5x}{5} \\ & \frac{\ln 32}{5} = x \\ & \boxed{0.693} \end{aligned}$$

13.  $\ln x = \ln 3 + \frac{1}{2}$

~~14.~~  $2^x = 3^{x-1}$

15.  $3^{x+2} = 5^{x-1}$

16.  $3e^{5x} + 2 = 7$

17.  $6 \ln(4x) - 1 = 14$

18.  $3(6)^{3x-2} + 4 = 12$

