480/81 Day 11 Notes

OBJECTIVES:

1) Use common logs to solve equations.

SOLVE LOGARITHM EQUATIONS BY APPLYING LOG PROPERTIES:

2) Apply the change of base formula.

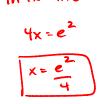
1) $2\log_{3} x = \log_{3} 9$ 2) $\log_{7} x = \frac{2}{3}\log_{7} 8$ $2\log_{5} x = \log_{5} 9$ $2\log_{5} x = 2 \quad o^{R} \log_{3} x^{2} = \log_{5} 9$ $\log_{7} x = \log_{7} (2^{3})^{2/3}$ $\log_{6} (x^{2} \cdot 4) = \log_{6} 6^{4}$ $\log_{6} (x^{2} \cdot 4) = \log_{6} 6^{4}$ $\ln_{10} x^{2} = 6^{4}$ $\ln_{10} x^{2} = 6^{4}$ $\ln_{10} x^{2} = 6^{4}$ x = 3 x = 4 x = 5 x = 4 x = 5 x = 4 x = 5 x = 4 x = 5 x = 4 x = 5 x = 4 x = 5 x = 6

4) $\log_8 48 - \log_8 y = \log_8 4$ ($\log_8 \frac{48}{7} = \log_8 4$ $\frac{48}{7} = 4$ $\frac{48}{7} = 4$ $\frac{48}{7} = 4$ $\frac{48}{7} = 4$ $\frac{5}{8}$ $\frac{32}{8}$ $\frac{32}{8}$ $\frac{32}{8$

7)
$$\ln(x+3) + \ln x = \ln 4$$

 $(n(x+3)\cdot x) = \ln 4$
 $x^{2}+3x = 4$
 $x^{2}+3x - 4 = 0$
 $(x-14)(x-1)=0$
 $x = \sqrt{4}$ $x = 1$

8) $\ln 4 + \ln x = \ln e^2$



9)
$$3\log_5(x^2+9)-6 = \log_5 1$$

 $3\log_5(x^2+9)-6 = 0$
 $3\log_5(x^2+9) = 6$
 $\log_5(x^2+9) = 2$
 $(x^2+9) = 2$
 (x^2+9)

CHANGE OF BASE FORMULA:

Why would we ever want to change the base of our logarithm? Well, the reason is that we cannot evaluate a logarithm like <u>loge</u> 7 in our heads.		
CHANGE OF BASE FORMULA:		
	$\log_a c = \frac{\log c}{\log a}$	(Base 10 can be put in) our calculator!)
Examples:	-	
1) $\log_4 25 =$	2) log ₃ 18 =	3) $\log_6 \sqrt{5} =$
log 25	log 18	log 25
10g 4	log 3	log 6
≈ 2.322	≈ 2.631	≈ .449

USE LOGS TO SOLVE EXPONENTIAL EQUATIONS:

State your answer as an exact answer and then approximate your answer to the nearest thousandths.

1)
$$3^{x} = 27$$

2) $5^{x} = 120$
3) $e^{x} = 52$
4) $4^{2x} = 27$
log₁ $x^{2} = x$
 $x = 3.951$
 $x = 1.189$
5) $2^{x-4} = 82$
6) $e^{2x-3} = 42$
1) $5^{x-3} = 72$
log₂ $8^{2} = x - 4$
log₃ $x - 5 + 6$
log₅ $x - 3 - 5$
log₆ $x - 3 - 5$
log₆ $x - 3 - 5$
log₆ $x - 3 - 5$
log₇ $x - 3 - 5$
log₈ $x -$