

Name:

Date:

Topic:

Class:

Main Ideas/Questions	Notes/Examples	
<p>Logarithmic Equations</p> <p>TYPE I: LOG = LOG</p> <p>* No Negative Logs Ex * $\log_3(-2)$</p> <p>Check: $\log_9(6-3(6))$ $\log_9(-12)$</p>	<p>① CONDENSE each logarithm.</p>	
	<p>② Use the One-to-One Property: If $\log_b m = \log_b n$, then</p>	
	<p>③ SOLVE and CHECK FOR EXTRANEOUS SOLUTIONS.</p>	
	<p>1. $\log_5(5x+9) = \log_5(6x)$</p> $\begin{array}{r} 5x+9 = 6x \\ -5x \quad -5x \\ \hline 9 = x \end{array}$	<p>2. $\log_2(1-4n) = \log_2(2n+43)$</p> $\begin{array}{r} 1-4n = 2n+43 \\ +4n \quad +4n \\ \hline 1 = 6n+43 \\ -43 \quad -43 \\ \hline -42 = 6n \\ -7 = n \end{array}$
	<p>3. $\log_9(6-3w) = \log_9(-2w)$</p> $\begin{array}{r} 6-3w = -2w \\ +3w \quad +3w \\ \hline 6 = w \end{array}$ <p style="text-align: center;">N.S.</p>	<p>4. $\log(y+5) + \log 4 = \log 72$</p> $\begin{array}{r} \log(4y+20) = \log 72 \\ 4y+20 = 72 \\ 4y = 52 \\ \hline y = 13 \end{array}$
<p>5. $3 \cdot \log_7 4 = \log_7(4a-8)$</p>	<p>6. $\log_4 68 - \log_4 4 = \log_4(3n+11)$</p>	
<p>7. $\frac{1}{2} \cdot \log_6 25 = \log_6(23-4w)$</p> $\begin{array}{r} \log_6 \sqrt{25} = \log_6(23-4w) \\ 5 = 23-4w \\ -18 = -4w \\ \hline 4.5 = w \end{array}$	<p>8. $\log_3(2p-5) = 2 \cdot \log_3 6 - \log_3 4$</p> $\begin{array}{r} \log_3(2p-5) = \log_3 6^2 - \log_3 4 \\ \log_3(2p-5) = \log_3 36 - \log_3 4 \\ \log_3(2p-5) = \log_3 \frac{36}{4} \\ 2p-5 = 9 \\ \hline 2p = 14 \\ \hline p = 7 \end{array}$	

$$\begin{array}{r} -18 \\ 9 \times -2 \\ \hline 7 \end{array}$$

$$9. \log_4(m^2) = \log_4(18-7m)$$

$$m^2 = 18-7m$$

$$m^2 + 7m - 18 = 0$$

$$(m+9)(m-2) = 0$$

$$\boxed{m = -9, 2}$$

$$10. \log 2 + \log(k^2) = \log(k^2 + 16)$$

TYPE 2:
LOG = NUMBER

- ① CONDENSE and ISOLATE the logarithm.
- ② Write the equation in EXPONENTIAL FORM.
- ③ SOLVE and CHECK FOR EXTRANEIOUS SOLUTIONS.

$$11. \log_2(x-4) = 6$$

$$2^6 = x-4$$

$$64 = x-4$$

$$\boxed{68 = x}$$

$$12. \log_3(4x+8) - 7 = -3$$

$$\begin{array}{r} +7 \quad +7 \\ \hline \log_3(4x+8) = 4 \end{array}$$

$$3^4 = 4x+8$$

$$81 = 4x+8$$

$$73 = 4x$$

$$\boxed{18.25 = x}$$

$$\boxed{x=10} \quad \checkmark -5$$

$$13. \log(2x) + \log(x-5) = 2$$

$$\log(2x^2 - 10x) = 2$$

$$10^2 = 2x^2 - 10x$$

$$100 = 2x^2 - 10x$$

$$0 = 2x^2 - 10x - 100$$

$$0 = 2(x^2 - 5x - 50)$$

$$0 = 2(x-10)(x+5)$$

$$\begin{array}{r} -50 \\ -10 \times 5 \\ \hline -5 \end{array}$$

$$14. 2 \cdot \log x - \log 4 = 2$$

$$15. \log_6(x+9) + \log_6 x = 2$$

$$16. \log(x-3) + \log x = 1$$