

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples		
<p><b>Product Property</b></p> $\log_b(m \cdot n) =$	<b>Condense into a single logarithm. Simplify if possible.</b>		
	1. $\log_2 7 + \log_2 4$	2. $\log 25 + \log 4$	3. $\log_4 2x + \log_4 4x^2$
	<b>Expand using the product property.</b>		
	4. $\log 6$	5. $\log_7 45$	6. $\log_2(5x)$
<p><b>Quotient Property</b></p> $\log_b\left(\frac{m}{n}\right) =$	<b>Condense into a single logarithm. Simplify if possible.</b>		
	7. $\log_3 24 - \log_3 8$	8. $\log_2 15 - \log_2 15$	9. $\log_4 x^9 - \log_4 x^2$
	<b>Expand using the quotient property.</b>		
	10. $\log_8 4$	11. $\log_5 \frac{1}{3}$	12. $\log\left(\frac{m}{7}\right)$
<p><b>Power Property</b></p> $\log_b m^n =$	<b>Condense into a single logarithm. Simplify if possible.</b>		
	13. $5 \cdot \log_4 2$	14. $7 \cdot \log_2 x$	15. $\frac{1}{3} \cdot \log 8$
	<b>Expand using the power property. Simplify if possible.</b>		
	16. $\log_2 8^7$	17. $3 \cdot \log 4^{x-1}$	18. $\log_7 \sqrt{w}$

## Putting it All Together!

### CONDENSING LOGS

**Directions:** Rewrite as a single logarithm. Simplify if possible.

**19.**  $2 \cdot \log 6 - \log 9$

**20.**  $4 \cdot \log_4 a + 2 \cdot \log_4 b$

**21.**  $7 \cdot \log_4 u - 3 \cdot \log_4 v^2$

**22.**  $\log_2 15 + \log_2 4 - \log_2 6$

**23.**  $\log_3 4 + \log_3 y + \frac{1}{2} \cdot \log_3 49$

**24.**  $\frac{1}{3}(\log_5 8 + \log_5 27) - \log_5 3$

**25.**  $3 \cdot \log_2 4 - \log_2 32$

**26.**  $2 \cdot \log 6 - \frac{1}{4} \cdot \log 16 + \log 3$

### EXPANDING LOGS

**Directions:** Expand each logarithm.

**27.**  $\log_6 (xyz^4)$

**28.**  $\log_4 \left( \frac{a^9}{b} \right)$

**29.**  $\log_7 (q^4 r^2)^2$

**30.**  $\log_2 \left( \frac{y}{z^5} \right)^2$

**31.**  $\log \sqrt{7x^3}$

**32.**  $\log_3 \sqrt[4]{m^5 n^2}$