

## 2.12 Logarithmic Function Manipulation

AP Precalculus

Name: \_\_\_\_\_

CA #1

<b>Instructions: Let x and y be positive constants. Write each as a single logarithm.</b>	
1. $2\log_4 x - 6\log_4 y$	2. $6\ln x + \frac{1}{2}\ln y$
3. $\frac{1}{3}(\log x + 2\log y)$	4. $\frac{1}{2}\log_5 x^3 - 2\log_5 y$
<b>Instructions: Let x and y be positive constants. Write each expression as a sum or difference of logarithms.</b>	
5. $\ln x^4 y$	6. $\log_3 \sqrt{\frac{x^2}{y}}$
7. $\log_6 \sqrt{x^3 y^5}$	8. $\log(10x - 30)$
<b>Instructions: Find the domain/range and describe any transformations on the function.</b>	
9. $\log_2(8x)$	
Domain:	Transformations:
Range:	
10. $\log_3(27 - 27x)$	
Domain:	Transformations:
Range:	

## Answers

1.  $\log_4 \frac{x^2}{y^6}$
2.  $\ln x^6 \sqrt{y}$
3.  $\log \sqrt[3]{xy^2}$
4.  $\log_5 \frac{\sqrt{x^3}}{y^2}$
5.  $4 \ln x + \ln y$
6.  $\frac{1}{2}(2\log_3 x - \log_3 y)$
7.  $\frac{1}{2}(3\log_6 x + 5\log_6 y)$
8.  $1 + \log(x - 3)$
9. Domain:  $(0, \infty)$  Range:  $(-\infty, \infty)$  Transformations: Vertical translation up 3.
10. Domain:  $(-\infty, 1)$  Range:  $(-\infty, \infty)$  Transformations: Vertical translation up 3, horizontal translation right 1. Horizontal reflection.