

## EXTRA PRACTICE — Exercises

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### Unit X – Exponential and Logarithmic Functions

#### Part C – Operations With Logarithms

#### Lesson 1 – Properties of Logarithms

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Apply the appropriate properties of logarithms in each of the following expressions to rewrite them as sums and differences of simple logarithms..

$$1. \log_2 \sqrt{\frac{z^3}{xy}}$$

$$2. \log_a \sqrt[4]{\frac{xy}{z^5}}$$

$$3. \log_4 \frac{x^2}{y^3 z}$$

$$4. \log_m \frac{xy}{m^3 n^4}$$

$$5. \log_a x^2 y^3 z^4$$

Apply the appropriate properties of logarithms in each of the following expressions to rewrite them as single logarithms.

$$6. \frac{1}{2} \log_a x - 7 \log_a y + \log_a z$$

$$7. 5 \log_a x - \log_a y + \frac{1}{4} \log_a z$$

$$8. \frac{2}{3} \log_a x - \frac{1}{2} \log_a y$$

$$9. \log_a 2x + 3(\log_a x - \log_a y)$$

$$10. \log_a \frac{\sqrt{x}}{b} - \log_a \sqrt{bx}$$

## EXTRA PRACTICE — Answers

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Apply the appropriate properties of logarithms in each of the following expressions to rewrite them as sums and differences of simple logarithms..

1.  $\frac{3}{2} \log_2 z - \frac{1}{2} \log_2 x - \frac{1}{2} \log_2 y$

2.  $\frac{1}{4} \log_a x + \frac{1}{4} \log_a y - \frac{5}{4} \log_a z$

3.  $2 \log_4 x - 3 \log_4 y - \log_4 z$

4.  $\log_m x + 3 \log_m y - 3 - \log_m n^4$

5.  $2 \log_a x + 3 \log_a y + 4 \log_a z$

Apply the appropriate properties of logarithms in each of the following expressions to rewrite them as single logarithms.

6.  $\log_a \frac{z\sqrt{x}}{y^7}$

7.  $\log_a \frac{x^{54}\sqrt{x}}{y^7}$

8.  $\log_a \sqrt[6]{\frac{x^4}{y^3}}$

9.  $\log_a \frac{2x^4}{y^3}$

10.  $\log_a \frac{\sqrt{b}}{b^2}$