

**A2.A.19: Properties of Logarithms 2: Apply the properties of logarithms to rewrite logarithmic expressions in equivalent forms**

1 The expression  $2\log_5 m + \log_5 n$  is equivalent to

- |                           |                          |
|---------------------------|--------------------------|
| 1) $\log_5 m^2 n$         | 3) $\log_5 \sqrt{mn}$    |
| 2) $\log_5 \frac{m^2}{n}$ | 4) $\log_5 \frac{2m}{n}$ |

2 The expression  $2\log x - 3\log y$  is equivalent to

- |                         |                                   |
|-------------------------|-----------------------------------|
| 1) $\log \frac{2x}{3y}$ | 3) $\log \frac{x^2}{y^3}$         |
| 2) $\log x^2 y^3$       | 4) $\frac{2}{3} \log \frac{x}{y}$ |

3 The expression  $2\log x - (3\log y + \log z)$  is equivalent to

- |                             |                          |
|-----------------------------|--------------------------|
| 1) $\log \frac{x^2}{y^3 z}$ | 3) $\log \frac{2x}{3yz}$ |
| 2) $\log \frac{x^2 z}{y^3}$ | 4) $\log \frac{2xz}{3y}$ |

4 The expression  $\log 10^{x+2} - \log 10^x$  is equivalent to

- |         |                    |
|---------|--------------------|
| 1) $-2$ | 3) $100$           |
| 2) $2$  | 4) $\frac{1}{100}$ |

5 The expression  $\frac{1}{2} \log m - 3 \log n$  is equivalent to

- |                                    |                                 |
|------------------------------------|---------------------------------|
| 1) $\log \sqrt{m} + \log n^3$      | 3) $\log \frac{m^2}{3\sqrt{n}}$ |
| 2) $\log \frac{1}{2} m + 3 \log n$ | 4) $\log \frac{\sqrt{m}}{n^3}$  |

6 The expression  $\frac{1}{3} \log a - 3 \log b$  is equivalent to

- |                              |                                   |
|------------------------------|-----------------------------------|
| 1) $\log(\sqrt[3]{a} - b^3)$ | 3) $\log \frac{\sqrt[3]{a}}{b^3}$ |
| 2) $\log \frac{a}{3b^3}$     | 4) $\log \frac{\sqrt[3]{a}}{3b}$  |

7 The expression  $3 \log x - \frac{1}{2} \log y$  is equal to

- |                                |   |
|--------------------------------|---|
| 1) $\log \frac{x^3}{y^2}$      | 3) $\log \sqrt{\frac{3x}{y}}$           |
| 2) $\log \frac{x^3}{\sqrt{y}}$ | 4) $\frac{\log 3x}{\frac{1}{2} \log y}$ |

8 The expression  $\frac{1}{2} \log a - 2 \log b$  is equivalent to

- |                                |                                |
|--------------------------------|--------------------------------|
| 1) $\log \frac{\sqrt{a}}{b^2}$ | 3) $\log \frac{a^2}{\sqrt{b}}$ |
| 2) $\log \sqrt{ab}$            | 4) $\log(\sqrt{a} - b^2)$      |

9 The expression  $\frac{1}{3} \log m - 2 \log n$  is equivalent to

- |   |                                   |
|---|-----------------------------------|
| 1) $\log \left( \frac{1}{3} m - 2n \right)$   | 3) $\log(\sqrt[3]{m} - n^2)$      |
| 2) $\log \left( \frac{m^3}{\sqrt{n}} \right)$ | 4) $\log \frac{\sqrt[3]{m}}{n^2}$ |

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### Answer Section

1 ANS: 1 PTS: 2 REF: 068423siii

2 ANS: 3 PTS: 2 REF: 080226siii

3 ANS: 1

$$2\log x - (3\log y + \log z) = \log x^2 - \log y^3 - \log z = \log \frac{x^2}{y^3 z}$$

PTS: 2 REF: 061010a2

4 ANS: 2 PTS: 2 REF: 010316b

5 ANS: 4 PTS: 2 REF: 080809b

6 ANS: 3 PTS: 2 REF: 018431siii

7 ANS: 2 PTS: 2 REF: 088528siii

8 ANS: 1 PTS: 2 REF: 018920siii

9 ANS: 4 PTS: 2 REF: 019529siii