

NAME: \_\_\_\_\_

1. Determine if the statement is sometimes, always, or never true.

$$\ln M = \frac{\log M}{\log e} \quad (\text{Assume } M > 0.)$$

2. Determine if the statement is sometimes, always, or never true.

$$\left(\frac{1}{4}\right)^x < \left(\frac{1}{5}\right)^x$$

3. Determine if the statement is sometimes, always, or never true.

$$\log_a M^r = \frac{\log_a M}{r}$$

(Assume  $M > 0$ ,  $a > 0$ , and  $a \neq 1$ .)

4. Determine if the statement is sometimes, always, or never true.

$$\log x - \log y = \frac{\log x}{\log y}$$

(Assume  $x > 0$  and  $y > 0$ .)

5. Determine if the statement is sometimes, always, or never true.

$$\log_a M^r = r \log_a M$$

(Assume  $M > 0$ ,  $a > 0$ , and  $a \neq 1$ .)

6. Determine if the statement is sometimes, always, or never true.

$$y = \log_a x \text{ if and only if } y = a^x$$

(Assume  $x > 0$ ,  $a > 0$ , and  $a \neq 1$ .)

7. Determine if the statement is sometimes, always, or never true.

$$a^x = \left(\frac{1}{a}\right)^{-x} \quad (\text{Assume } a > 0.)$$

8. Determine if the statement is sometimes, always, or never true.

$$a^x = -a^x \quad (\text{Assume } a > 0.)$$

9. Determine if the statement is sometimes, always, or never true.

$$3^x > 2^x$$

10. Determine if the statement is sometimes, always, or never true.

$$\log x - \log y = \log\left(\frac{x}{y}\right)$$

(Assume  $x > 0$  and  $y > 0$ .)

11. Determine if the statement is sometimes, always, or never true.

$$\ln M = \frac{\log e}{\log M} \quad (\text{Assume } M > 0.)$$

- [1] always true
- [2] sometimes true
- [3] sometimes true
- [4] sometimes true
- [5] always true
- [6] never true
- [7] always true
- [8] never true
- [9] sometimes true
- [10] always true
- [11] sometimes true