

Exponents and Logarithms (KEY)

1) What bold statement does a Logarithm make?

“I am the exponent that raises ___ to ___!”

Explain or describe the meaning of each expression and evaluate.

2) $4^5 = 4 \times 4 \times 4 \times 4 \times 4$

3) 2^3

4) 9^2

1,024

5) $3^{-4} = \frac{1}{3 \cdot 3 \cdot 3 \cdot 3} = \frac{1}{81}$

6) 7^{-2}

7) 5^{-3}

8) $x^0 = \frac{x^3}{x^3} = x^{3-3} = x^0 = 1$

9) 5^0

10) 9^0

11) $\text{Log}_{10} 100 = 2$

12) $\text{Log}_7 49$

13) $\text{Log}_5 25$

The exponent that raises 10 to 100.

14) $\text{Log}_6 36 = 2$

15) $\text{Log}_2 32$

16) $\text{Log}_5 1 = 0$

The exponent that raises 6 to 36.

The exponent that raises 5 to 1.

17) $\text{Log}_2 2 = 1$

18) $\text{Log}_3 1$

19) $\text{Log}_5 5$

The exponent that raises 2 to 2.

20) $\text{Log}_2 4 = 2$

21) $\text{Log}_3 3$

22) $\text{Log}_4 4$

The exponent that raises 2 to 4.

23) $\text{Log}_2 8 = 3$

24) $\text{Log}_3 9$

25) $\text{Log}_4 16$

The exponent that raises 2 to 8.

26) $\text{Log}_2 16 = 4$

27) $\text{Log}_3 27$

28) $\text{Log}_4 64 = 3$

The exponent that raises 2 to 16.

The exponent that raises 4 to 64.

29) $\text{Log}_2 \frac{1}{2} = -1$

30) $\text{Log}_3 \frac{1}{3}$

31) $\text{Log}_{16} 1$

The exponent that raises 2 to 1/2.

$$32) \log_2 \frac{1}{4} = -2$$

The exponent that raises 2 to 1/4.

$$35) \log_2 \frac{1}{8} = -3$$

The exponent that raises 2 to 1/8.

$$38) \log_7 1 = 0$$

The exponent that raises 7 to 1.

$$41) \log_7 \frac{1}{49} = -2$$

The exponent that raises 7 to 1/49.

$$33) \log_3 \frac{1}{9}$$

$$36) \log_3 \frac{1}{27}$$

$$39) \log_6 1$$

$$42) \log_6 \frac{1}{6}$$

$$34) \log_{16} \frac{1}{16} = -1$$

The exponent that raises 16 to 1/16.

$$37) \log_4 \frac{1}{16} = -2$$

The exponent that raises 4 to 1/16.

$$40) \log_9 9$$

$$43) \log_9 \frac{1}{81}$$