

Exponents and Logarithms 2.2 (Key)
Algebra 2

1) What bold statement does an exponent make?

I am the exponent that turns ___ into ___!

Explain or describe the meaning of each expression and evaluate.

2) $7^3 = 7 \cdot 7 \cdot 7 = 343$

3) $6^{-2} = \frac{1}{6^2} = \frac{1}{36}$

4) $27^{2/3} = \left(\sqrt[3]{27}\right)^2 = 3^2 = 9$

5) $b^0 = 1$

6) $32^{-2/5} = \frac{1}{32^{2/5}} = \frac{1}{\left(\sqrt[5]{32}\right)^2} = \frac{1}{2^2} = \frac{1}{4}$

7) $4^1 = 4$

8) $25^{3/2} = \left(\sqrt{25}\right)^3 = 5^3 = 125$

9) $8^{5/3} = \left(\sqrt[3]{8}\right)^5 = 2^5 = 32$

10) $10^0 = 1$

11) $27^{-5/3} = \frac{1}{27^{5/3}} = \frac{1}{\left(\sqrt[3]{27}\right)^5} = \frac{1}{3^5} = \frac{1}{243}$

12) $\log_9 81$ What is the exponent that raises 9 to 81? 2

13) $\log_2 64$ What is the exponent that raises 2 to 64? 6

14) $\log_{10} 1000$ What is the exponent that raises 10 to 1000? 3

15) $\log_5 625$ What is the exponent that raises 5 to 625? 4

16) $\log_a 1$ What is the exponent that raises a to 1? 0

17) $\log_{12} 12$ What is the exponent that raises 12 to 12? 1

18) $\log_{36} 6$ What is the exponent that raises 36 to 6? $1/2$

19) $\log_4 0$ What is the exponent that raises 4 to 0? Nothing

20) $\log_{25} 125$ What is the exponent that raises 25 to 125? $3/2$

21) $\log_{10} 100$ What is the exponent that raises 10 to 100? 2

- 22) $\text{Log}_{20} 20$ What is the exponent that raises 20 to 20? 1
- 23) $\text{Log}_8 2$ What is the exponent that raises 8 to 2? $1/3$
- 24) $\text{Log}_{49} 1/7$ What is the exponent that raises 49 to $1/7$? $-1/2$
- 25) $\text{Log}_{10} 1$ What is the exponent that raises 10 to 1? 0
- 26) $\text{Log}_{125} 25$ What is the exponent that raises 125 to 25? $2/3$
- 27) $\text{Log}_5 1/5$ What is the exponent that raises 5 to $1/5$? -1
- 28) $\text{Log}_{10} 0$ What is the exponent that raises 10 to 0? Nothing
- 29) $\text{Log}_{243} 1/81$ What is the exponent that raises 243 to $1/81$? $-4/5$

Write the exponential equation in logarithmic form.

30) $12^2 = 144$ $\text{Log}_{12} 144 = 2$ 31) $7^0 = 1$ $\text{Log}_7 1 = 0$

32) $4^3 = 64$ $\text{Log}_4 64 = 3$ 33) $9^{-1/2} = 1/3$ $\text{Log}_9 \left(\frac{1}{3} \right) = \frac{-1}{2}$

Write the logarithmic equation in exponential form.

34) $\text{Log}_{11} 121 = 2$ $11^2 = 121$ 35) $\text{Log}_3 27 = 3$ $3^3 = 27$

36) $\text{Log}_8 1 = 0$ $8^0 = 1$ 37) $\text{Log}_{16} 8 = 3/4$ $16^{3/4} = 8$