"Who always goes to bed with shoes on?"

Cross out the letter that matches your answer.
The remaining letters will allow you to figure out the joke.

Write the following logarithms in exponential form.

1. $\log_2 32 = 5$

2. $\log_4 64 = 3$

3. $\log_{25} 5 = \frac{1}{2}$

4. $\log_5 \frac{1}{25} = -2$

Write the following in logarithm form.

5. $3^4 = 81$

6. $7^{-2} = \frac{1}{49}$

7. $4^5 = 1024$

H	P	T	O
$\log_4 3 = 81$	$\log_4 1024 = 5$	$2^5 = 32$	$4^{64} = 3$
M	**U**	**R**	**N**
$25^{\frac{1}{2}} = 5$	$\log_3 81 = 4$	$\log_{\frac{1}{3}} 216 = 6$	$\log_7 \frac{1}{49} = -2$
S	**Y**	**W**	**E**
$\left(\frac{1}{2}\right)^{25} = 5$	$4^3 = 64$	$5^{-2} = \frac{1}{25}$	$\log_{1024} 5 = 4$

Answer: _____

"What do you call a mad astronaut?"

Evaluate the following logarithms. Round your answers to the nearest hundredth. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $\log_3 28$
2. $\log_5 41$
3. $\log_6 \frac{1}{4}$
4. $\log_8 64$
5. $\log_7 7$
6. $\log 23$
7. $\log_3 4 + \log_2 5$
8. $\log_7 9 - \log_6 2$

B: 2.57

R: 1

O: 3.03

E: 0

T: -0.77

W: 3.14

N: 3.58

U: 2.31

M: -0.53

A: 1.36

T: 2

P: 1.72

S: 0.74

6	8	3	5	1	7	2	4

Answer: _____

"How do you get a baby astronaut to go to sleep?"

Write each expression as a single logarithm. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $\log_3 x + \log_3 y$
2. $\log_4 x - \log_4 y$
3. $7\log_3 x$
4. $3\log_3 x + 2\log_3 x$
5. $4\log_4 x - 3\log_4 y - \log_4 z$
6. $\frac{1}{2}\log_3 x + 6\log_3 y$
7. $3(\log_4 x + \log_4 y)$
8. $\log_4 (x+2) + \log_4 (x-2)$
9. $2\log_3 (x-1) - \log_3 x$

D: $\log_4 (x-8)$

O: $\log_3 x^7$

K: $\log_4 x^3 y^3$

S: $\log_3 x^6$

E: $\log_4 \left(\frac{x}{y}\right)$

C: $\log_3 x^5$

Y: $\log_4 (x^2 - 4)$

O: $\log_3 xy$

A: $\log_4 \left(\frac{1}{xy}\right)$

U: $\log_3 y^6\sqrt{x}$

R: $\log_3 \left(\frac{x^2 - 2x + 1}{x}\right)$

W: $\log_4 x^6 y$

T: $\log_4 \frac{x^4}{y^3 z}$

8	3	6		9	1	4	7	2	5

Answer: _____

"Where would you find a prehistoric cow?"

Write each expression as a single logarithm. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $7\log x + 3\log y - 2\log z$
2. $\log \frac{1}{x} + 6\log x$
3. $14\log \sqrt{x}$
4. $\log (x + 3) + \log (x - 1)$
5. $\frac{1}{2}(\log x + \log (x + 5))$
6. $\log (x^2 + 4x) - 3\log x$
7. $3\log x - \log \frac{1}{x}$
8. $\log (x - 3) - \log (x^2 - 6x + 9)$
9. $\log x - 3(2\log y + \log z)$
10. $\log (x + 2) + \log (x - 1) - \log (x^2 + 3x - 4)$

S: $\log x^4$

D: $\log (x + 2)$

E: $\log x^5$

U: $\log \sqrt{x^2 + 5x}$

A: $\log \frac{x^7y^3}{z^2}$

O: $\log (x^2 + 2x - 3)$

W: $\log x^2$

I: $\log \frac{1}{x - 3}$

M: $\log \frac{x + 2}{x + 4}$

N: $\log x^7$

Y: $\log \sqrt{x}$

O: $\log \frac{x}{y^6z^3}$

M: $\log \frac{x + 4}{x^2}$

8	3	1	10	4	9	7	2	5	6

Answer: _____

"What do you call a person who likes to blow up bars?"

Write each expression as a single logarithm. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $5\log_3 x + 7\log_3 y$
2. $6\log x - 4\log y - 2\log z$
3. $3(\log_3 x - 4\log_3 y)$
4. $\log \frac{1}{x} + 4\log x$
5. $20\log\sqrt[5]{x}$
6. $3\log_3 x - \log_3 \frac{1}{y}$
7. $\frac{1}{2}(\log x + 3\log y) - 2\log z$
8. $3(2\log_3 x - 4\log_3 y) + 2(5\log_3 y - \log_3 x)$
9. $\log_3 x - 2(\log_3 y + 3\log_3 x)$
10. $\log\left(\frac{x^2}{x^2-1}\right) + \log\left(\frac{x+1}{x}\right)$
11. $\log(x^2 + 2x + 1) - \log(x^2 - 1)$
12. $\log(x + 2) - (\log(x^2 - 4) - \log(x^2 - x - 2))$

N: $\log_3 x^3y$

O: $\log\left(\frac{x}{x-1}\right)$

L: $\log x^3$

O: $\log_3 x^5y^7$

S: $\log(x + 1)$

O: $\log \frac{y\sqrt{xy}}{z^2}$

A: $\log_3 \frac{x^4}{y^2}$

E: $\log \frac{x^6}{y^4z^2}$

R: $\log x^4$

B: $\log\left(\frac{x+1}{x-1}\right)$

A: $\log_3 \frac{x^3}{y^{12}}$

M: $\log_3 \frac{1}{x^5y^2}$

12	8	4	1	10	6	3	11	7	9	11	2	5

Properties of Logarithms

Joke #14