

Logarithmagic!!!!

Logarithm is just a really fancy word for **an exponent in reverse**:

$$\log_a(b)$$

is like asking:

$$a^{\text{what}} = b$$

So, for example:

- $\log_2(8)$ is the like as asking $2^{\text{what}} = 8$
 - the answer is 3, since $2^3 = 8$
 - so $\log_2(8) = 3$
- $\log_5(25)$ is the like as asking $5^{\text{what}} = 25$
 - the answer is 2, since $5^2 = 25$
 - so $\log_5(25) = 2$

- [REDACTED]
 - [REDACTED]
 - [REDACTED]

whoops redacting these other examples
'cause I don't think you need them :)

- [REDACTED]
 - [REDACTED]
 - [REDACTED]

Problems

1. $\log_2(8)$

2. $\log_2(16)$

3. $\log_2\left(\frac{1}{2}\right)$

4. $\log_3(9)$

5. $\log_3(27)$

6. $\log_3(81)$

7. $\log_4(64)$

8. $\log_4(16)$

9. $\log_4(32)$

10. $\log_7(49)$

11. $\log_{49}(7)$

12. $\log_7\left(\frac{1}{49}\right)$

13. $\log_{1/49}(7)$

14. $\log_{1/49}\left(\frac{1}{7}\right)$

15. $\log_5(25)$

16. $\log_5(1)$

17. $\log_5\left(\frac{1}{25}\right)$

18. $\log_6(36)$

19. $\log_6(216)$

20. $\log_{216}(6)$

21. $\log_{1/3}(9)$

22. $\log_3(-9)$

23. $\log_{1/3}(-9)$

24. $\log_{10}(10,000)$

25. $\log_{1/2} \left(\frac{1}{4} \right)$

26. $\log_{\frac{3}{2}} \left(\frac{4}{9} \right)$

27. $\log_{10}(0.000000000000001)$

28. $\log_4(-64)$

29. $\log_4(1/16)$

30. $\log_4(128)$

31. $\log_{\frac{1}{16}}(2)$

32. $\log_{2025}(1)$

33. $\log_{2025}(45)$

34. $\log_{5\sqrt[3]{5}}(25)$

35. $\log_{8192}(2)$

36. $\log_{8192}(4)$

37. $\log_5(-25)$

43. $\log_7(50)$

38. $\log_7(0)$

44. $\log_{12}(100)$

39. $\log_7(1)$

45. $\log_{3\sqrt{3}}(729)$

40. $\log_9(243)$

46. $\log_{4\sqrt[3]{2}}(32)$

41. $\log_{125}(0.0016)$

47. $\log_2(3000)$

42. $\log_{512}(1/2)$

48. $\log_{a+b}(a^2 + 2ab + b^2)$

$$49. \log_{a-b} (a^2 - 2ab + b^2)$$

$$50. \log_{a+b} (a^3 + 3a^2b + 3ab^2 + b^3)$$

$$51. \log_{a+b} (a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6)$$

$$52. \log_{a^3b^4} \left(\frac{b^{-12}}{(\sqrt[4]{a^3})^{12}} \right)$$

$$53. \log_{\frac{7}{(qr^3)^9}} \left(\frac{q^{18}r^{24}}{49} \right)$$

$$54. \log_{\frac{x^2\sqrt{b}}{y^3}} \left(\left(\frac{y^2}{x^3} \right)^4 \cdot \frac{y^{10}}{b^3} \right)$$