

Math Sheet

Name _____ Score _____ / 24 Teacher _____ Date _____

The Meaning of Logarithms

Rewrite between logarithmic and exponential form, then evaluate each logarithm exactly.

1. Rewrite in exponential form.

$$\log_{10} 100 = 2$$

2. Rewrite in exponential form.

$$\log_{216} 6 = \frac{1}{3}$$

3. Rewrite in exponential form.

$$\log_7 \frac{1}{16807} = -5$$

4. Rewrite in exponential form.

$$\log_r \frac{8}{11} = -1 \quad \cdot s$$

Domain: real variables $r > 0$ $r \neq 1$ $s \in \mathbb{R}$ s : real numbers

5. Rewrite in exponential form.

$$\log_q w = -4$$

Domain: real variables $q > 0$ $q \neq 1$ $w > 0$

6. Rewrite in exponential form.

$$\log_9 81 = 2$$

7. Rewrite in logarithmic form.

$$10^2 = 100$$

8. Rewrite in logarithmic form.

$$16807^{\frac{1}{5}} = 7$$

9. Rewrite in logarithmic form.

$$8^{-2} = \frac{1}{64}$$

10. Rewrite in logarithmic form.

$$p^b = \frac{4}{9}$$

Domain: real variables $p > 0$ $p \neq 1$ $b \in \mathbb{R}$ b : real numbers

11. Rewrite in logarithmic form.

$$k^4 = r$$

Domain: real variables $k > 0$ $k \neq 1$ $r > 0$

12. Rewrite in logarithmic form.

$$12^3 = 1728$$

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The Meaning of Logarithms

Rewrite between logarithmic and exponential form, then evaluate each logarithm exactly.

13. Evaluate exactly.
 $\log_{10} 10000$

14. Evaluate exactly.
 $\log_{1024} 4$

15. Evaluate exactly.
 $\log_6 \frac{1}{7776}$

16. Evaluate exactly.
 $\log_3 9$

17. Evaluate exactly.
 $\log_{4096} 8$

18. Evaluate exactly.
 $\log_5 \frac{1}{625}$

19. Evaluate exactly.
 $\log_{15} 225$

20. Evaluate exactly.
 $\log_8 2$

21. Evaluate exactly.
 $\log_4 \frac{1}{64}$

22. Evaluate exactly.
 $\log_{12} 20736$

23. Evaluate exactly.
 $\log_{625} 5$

24. Evaluate exactly.
 $\log_{13} \frac{1}{169}$

The Meaning of Logarithms

Answer Key

Rewrite between logarithmic and exponential form, then evaluate each logarithm exactly.

1. Rewrite in exponential form.

$$\log_{10} 100 = 2$$

Work:

$$10^2 = 100$$

2. Rewrite in exponential form.

$$\log_{216} 6 = \frac{1}{3}$$

Work:

$$216^{\frac{1}{3}} = 6$$

3. Rewrite in exponential form.

$$\log_7 \frac{1}{16807} = -5$$

Work:

$$7^{-5} = \frac{1}{16807}$$

4. Rewrite in exponential form.

$$\log_r \frac{8}{11} = -1 \cdot s$$

Domain: real variables $r > 0$ $r \neq 1$ $s \in \mathbb{R}$ s : real numbers

Work:

$$r^{-s} = \frac{8}{11}$$

5. Rewrite in exponential form.

$$\log_q w = -4$$

Domain: real variables $q > 0$ $q \neq 1$ $w > 0$

Work:

$$q^{-4} = w$$

6. Rewrite in exponential form.

$$\log_9 81 = 2$$

Work:

$$9^2 = 81$$

7. Rewrite in logarithmic form.

$$10^2 = 100$$

Work:

$$\log_{10} 100 = 2$$

8. Rewrite in logarithmic form.

$$16807^{\frac{1}{5}} = 7$$

Work:

$$\log_{16807} 7 = \frac{1}{5}$$

9. Rewrite in logarithmic form.

$$8^{-2} = \frac{1}{64}$$

Work:

$$\log_8 \frac{1}{64} = -2$$

10. Rewrite in logarithmic form.

$$p^b = \frac{4}{9}$$

Domain: real variables $p > 0$ $p \neq 1$ $b \in \mathbb{R}$ b : real numbers

Work:

$$\log_p \frac{4}{9} = b$$

11. Rewrite in logarithmic form.

$$k^4 = r$$

Domain: real variables $k > 0$ $k \neq 1$ $r > 0$

Work:

$$\log_k r = 4$$

12. Rewrite in logarithmic form.

$$12^3 = 1728$$

Work:

$$\log_{12} 1728 = 3$$

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The Meaning of Logarithms

Answer Key

Rewrite between logarithmic and exponential form, then evaluate each logarithm exactly.

13. Evaluate exactly.
 $\log_{10} 10000$

Work:
4

14. Evaluate exactly.
 $\log_{1024} 4$

Work:
 $\frac{1}{5}$

15. Evaluate exactly.
 $\log_6 \frac{1}{7776}$

Work:
-5

16. Evaluate exactly.
 $\log_3 9$

Work:
2

17. Evaluate exactly.
 $\log_{4096} 8$

Work:
 $\frac{1}{4}$

18. Evaluate exactly.
 $\log_5 \frac{1}{625}$

Work:
-4

19. Evaluate exactly.
 $\log_{15} 225$

Work:
2

20. Evaluate exactly.
 $\log_8 2$

Work:
 $\frac{1}{3}$

21. Evaluate exactly.
 $\log_4 \frac{1}{64}$

Work:
-3

22. Evaluate exactly.
 $\log_{12} 20736$

Work:
4

23. Evaluate exactly.
 $\log_{625} 5$

Work:
 $\frac{1}{4}$

24. Evaluate exactly.
 $\log_{13} \frac{1}{169}$

Work:
-2