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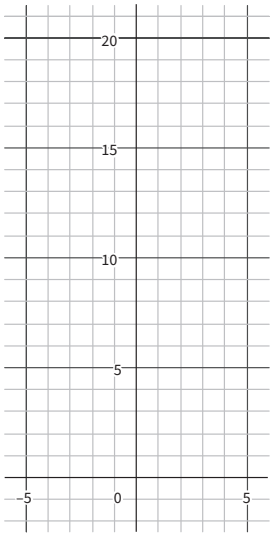
Lesson 1: Log Logic

Ready, Set, Go

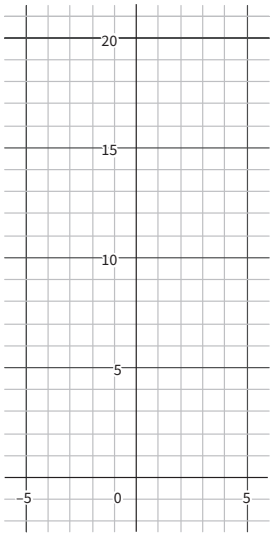
Ready

Graph each function over the domain $\{-4 \leq x \leq 4\}$.

1. $y = 2^x$



2. $y = 2 \cdot 2^x$



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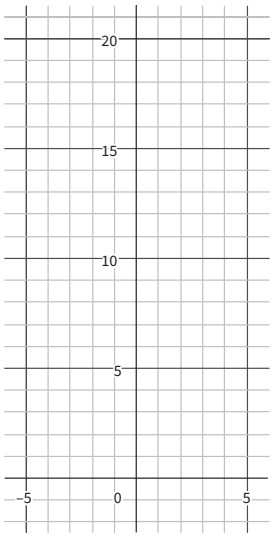
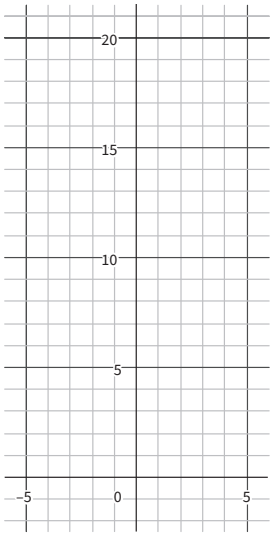
3. $y = (\frac{1}{2})^x$



4. $y = 2(\frac{1}{2})^x$



5. Compare problem 1 to problem 2. Multiplying by 2 should generate a vertical stretch of the graph, but the graph looks like it has been translated vertically. How do you explain that?

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6. Compare problem 3 to problem 4. Is your explanation in problem 5 still valid for these two graphs? Explain.

Set

7. Given that $f(x) = 3^x$, $f^{-1}(x) =$

8. Given that $f(x) = 7^x$, $f^{-1}(x) =$

9. Given that $f(x) = a^x$, $f^{-1}(x) =$

10. Given that $f^{-1}(x) = \log_{10} x$, $f(x) =$

11. Given that $f^{-1}(x) = \log_{27} x$, $f(x) =$

Given $f(x) = 5^x$. Use the table to fill in the missing values and evaluate the log expression.

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x	$f(x) = 5^x$
0	1
1	5
2	25
3	125
4	625
5	3,125

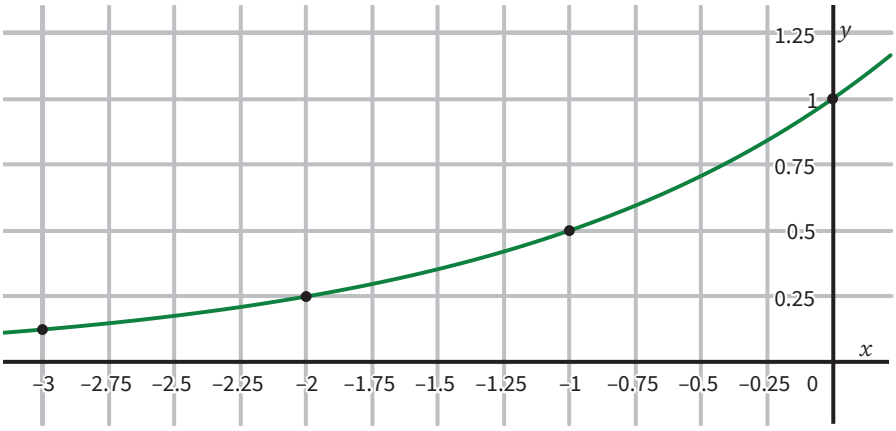
12. $f^{-1}(25) = \log_5$ _____ = _____.

13. $f^{-1}(3{,}125) = \log_5$ _____ = _____.

14. $f^{-1}($ _____ $) = \log_5$ _____ $= 1$

Given $h(x) = 2^x$ and $k(x) = h^{-1}(x)$.

Use the graph of $h(x) = 2^x$ to find the missing value in each equation.



15. $h^{-1}($ _____ $) = \log_2(\frac{1}{2}) =$ _____.

16. $h^{-1}(1) = \log_2$ _____ = _____.

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17. $h^{-1}(0.25) = \log_2 \_\_\_\_\_ = \_\_\_\_\_$.

18. Answer the question yes or no. If yes, give an example of the answer. If no, explain why not.

Does $\log_x 0$ have an answer?

Go

Apply the properties of exponents to find equivalent numerical expressions that no longer have exponents.

19. 27^0

20. $11(-6)^0$

21. -3^{-2}

22. 4^{-3}

23. $\frac{9}{2^{-1}}$

24. $\frac{4^3}{8^0}$

25. $3\left(\frac{29^3}{11^5}\right)^0$

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26. $\dfrac{3}{6^{-1}}$

27. $\dfrac{32^{-1}}{4^{-1}}$