#5 WS Pre-Calculus More Logs, Graphs & Applications

Name Key

Use the graph of $f(x)=\log x$ to **describe** the transformation that results in $g(x)$. NO CALCULATOR

1. $g(x)=\log(x+4)$

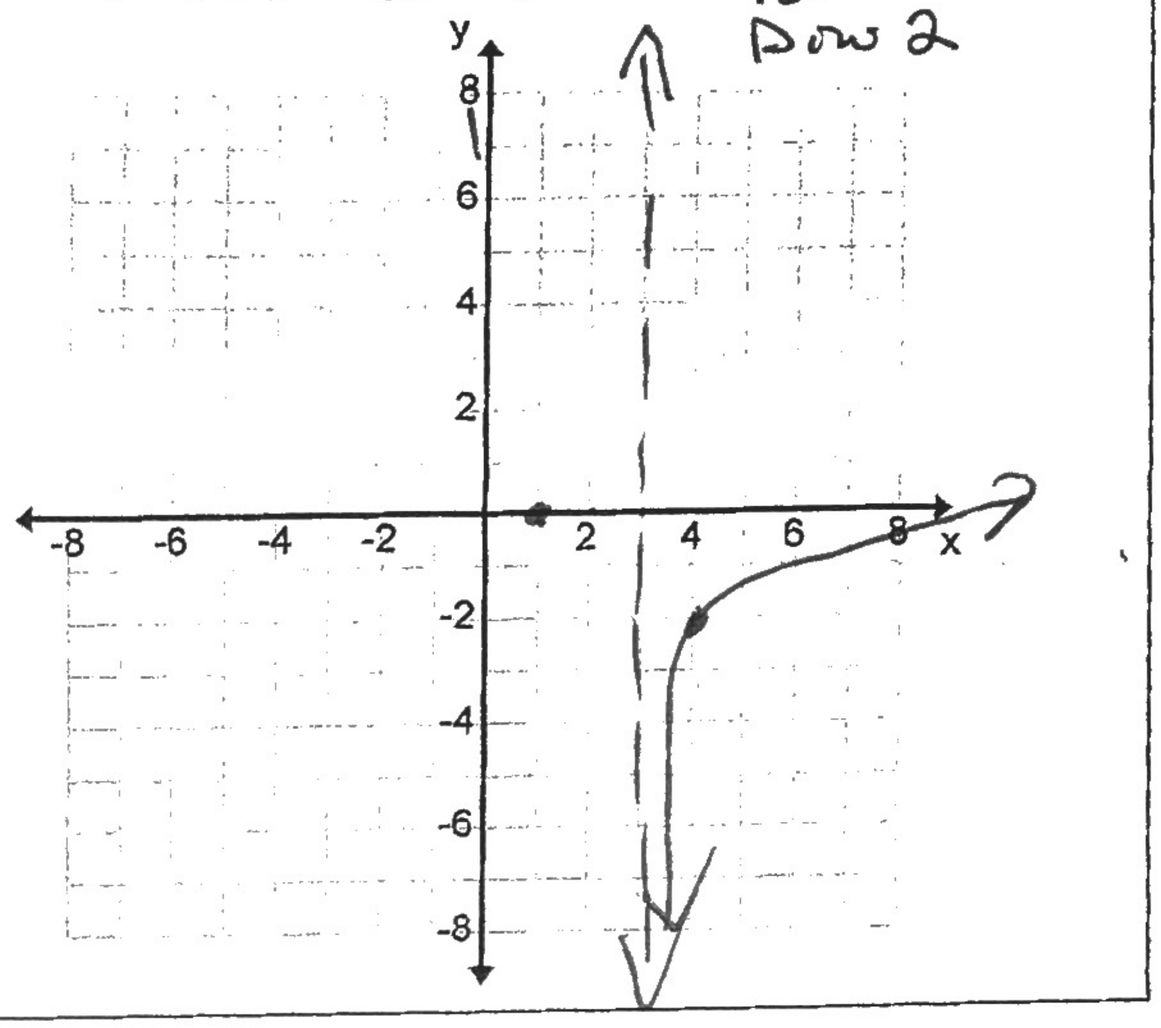
left 4

2. $g(x)=\log(x-2)$

[illegible]

7. Graph: $f(x)=\log(x-3)-2$

Rt 3
Dow 2



3. $g(x)=\log 2x$

horizontal
[illegible] Compression
of $\frac{1}{2}$

4. $g(x)=2\log x$

5. $g(x)=3\ln(x)+1$

Vertical Stretch by 3
Up 1

6. $g(x)=-2\log x+5$

Solve for x. NO CALCULATOR. SHOW YOUR WORK.

8. $16^{x+2}=\left(\frac{1}{2}\right)^{x^2-20}$

9. $9^{x+3}=\sqrt[3]{81}$

$3^{2(x+3)}=3^{\frac{4}{3}}$

$2x+6=\frac{4}{3}$

$6x+18=4$

$6x=-14$

$x=-\frac{7}{3}$

10. $16^{x+2}\cdot 4^{x}=8^{x-4}$

Simplify. **NO NEGATIVE EXPONENTS!**

11. $\left(5x^{\frac{2}{3}}\right)^2\left(-2x^{\frac{7}{3}}\right)$

$(25x^{\frac{4}{3}})(-2x^{\frac{7}{3}})$

$-50x^{\frac{11}{3}}$

12. $\left(\frac{y^{-12}z^{6}}{125x^{-1}}\right)^{\frac{2}{3}}$

$\frac{y^{-8}z^{4}}{5^{2}x^{-\frac{2}{3}}}=\frac{x^{\frac{2}{3}}z^{4}}{25y^{8}}$

13. $\sqrt[2]{\sqrt[4]{\sqrt[3]{\frac{x^{-36}y^{12}}{z^{48}}}}}$

$\frac{x^{-\frac{36}{24}}y^{\frac{12}{24}}}{z^{\frac{48}{24}}}=\frac{y^{\frac{1}{2}}}{x^{\frac{3}{2}}z^{2}}$

Solve for x. NO CALCULATOR. SHOW YOUR WORK. HINT: USE "U" SUBSTITUTION.

14. $e^{2x}+3e^{x}+130=0$

15. $e^{2x}+3e^{x}+2=0$

$u=e^{x}$

$u^{2}=e^{2x}$

$u^{2}+3u+2=0$

$(u+1)(u+2)=0$

$u=-1 \quad u=-2$

$e^{x}=-1 \quad e^{x}=-2$

No solution

16. $2e^{2x}+e^{x}-1=0$

Solve each for x. NO CALCULATOR. SHOW YOUR WORK. HINT: Use Properties of Logs to write in exponential form.

17. $\ln x + \ln(x+2) = \ln 63$

$\ln x(x+2) = \ln 63$

$x^2 + 2x = 63$

$x^2 + 2x - 63 = 0$

$(x+9)(x-7) = 0$

$x = -9$ or 7

$\boxed{x = 7}$

18. $\log(5x^2+4) = 2\log 3x^2 - \log(2x^2-1)$

19. $\ln(4x^2 - 3x) = \ln(16x-12) + \ln x$

$\ln(4x^2-3x) = \ln\left(\frac{16x-12}{x}\right)$

$4x^2 - 3x = \frac{(16x-12)}{x}x$

$4x^2 - 3x$

Solve each for x. CALCULATOR Allowed, round to the nearest hundredth. SHOW YOUR WORK.

20. $3e^{4x} = 45$

21. $8^{x-1} = 3.4$

$\log_8 3.4 = x-1$

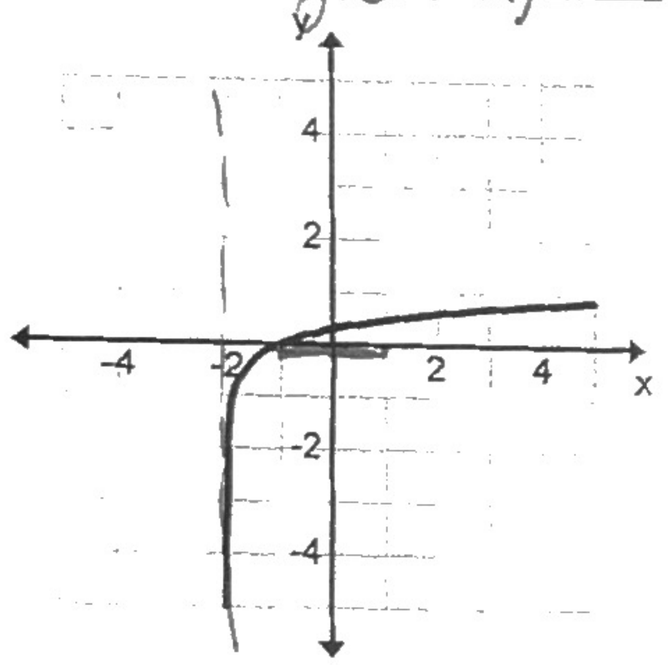
$.589 \approx x-1$

$\boxed{1.589 \approx x}$

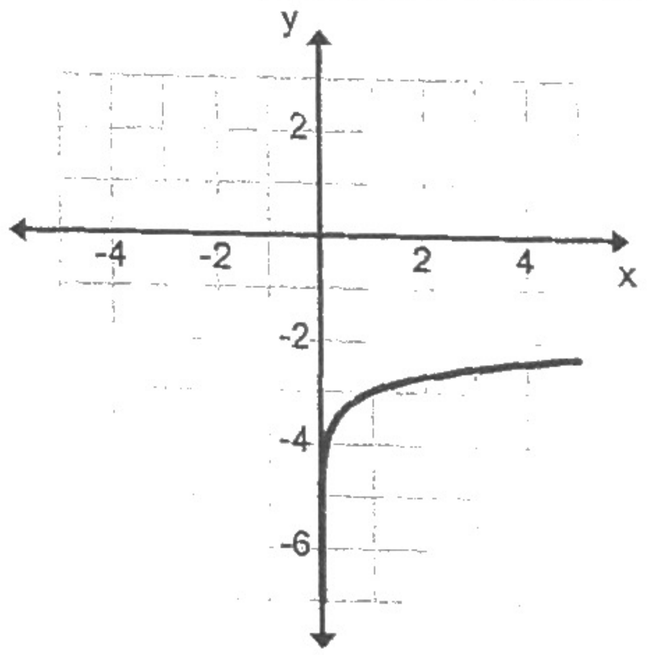
22. $e^{3x+1} = 51$

Use the parent function of $f(x) = \log x$ to write the equation g(x) for each:

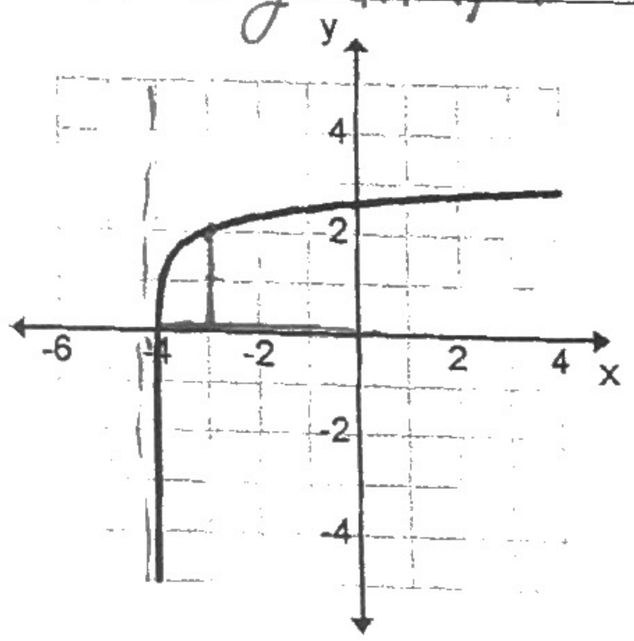
23. $g(x) =$ $\log(x+2)$



24. $g(x) =$ _____



25. $g(x) =$ $\log(x+4) + 2$



SHOW YOUR WORK (on a separate piece of paper as needed).

26. A deposit of $5000 is made in a trust fund that pays 7.5% interest, compounded continuously. It is specified that the balance will be given to the college from which the donor graduated after the money has earned interest for 50 years. How much will the college receive?

$1,212,605.41

27. The Whites inherited $3500, which they want to save for their daughter's college tuition. They purchase a certificate of deposit paying 8.25% interest compounded continuously. Determine how long it will take the investment to earn $1500 in interest.

$t \approx 4.3$

28. Charlene wants to purchase a car in 3 years. She needs a down payment of about $4000. Determine the continuously compounded interest rate at which she would have to deposit $3200 so that she will have the money she needs at the end of three years. **GIVE YOUR RATE AS A PERCENT!**

7.4%

29. Suppose that a radioactive substance decays according to the formula $N = Pe^{-kt}$, where N represents the amount present after t years and P represents the initial amount. Suppose that after 25 years one-half of the original amount will remain (this is known as the half-life). Find k. How long will it take for the original amount to decay to $\frac{1}{8}$ of its original amount?

75 yrs.