

FCC3 - - Review Exponents and Logs

- Write an equivalent logarithmic equation for $x^5 = 32$.
- Write an equivalent exponential equation for $\ln x = \sqrt{5}$
- The log 0.034 is between what two consecutive integers?
- Given $\log 8.1 = 0.9085$, find the log 8100.

- $\log_x 32 = 5$
- $e^{\sqrt{5}} = x$
- $-2 \leq -1$
- 3.9085

Simplify Completely:

- | | | | | |
|--------------------------|--------------|-----------------------------|-----------------|----------------------|
| 6. $\log_8 \frac{1}{64}$ | 7. $\ln e^9$ | 8. $\log_2 4^{\frac{3}{2}}$ | 9. $\log_8 4$ | 10. $27^{-\log_3 5}$ |
| $= -2$ | $= 9$ | $= 3$ | $= \frac{2}{3}$ | $= \frac{1}{125}$ |

Solve the following:

- | | | |
|---|---|--|
| 11. $\log_x 1 = 0$
$x^0 = 1$
$x = 1$ | 12. $\log_{1000} 100 = x$
$1000^x = 100$
$10^{3x} = 10^2$
$x = \frac{2}{3}$ | 13. $\log_4 (\log_5 25) = \log_3 x$
$\log_4 2 = \log_3 x$
$\frac{1}{2} = \log_3 x$
$3^{\frac{1}{2}} = x$ $x = \sqrt{3}$ |
| 14. $4^{x-2} = 8^{\pi+1} \div 8^{\pi-1}$
$4^{x-2} = 8^{\pi+1 - \pi+1}$
$4^{x-2} = 8^2$
$2^{2(x-2)} = 2^6 \rightarrow 2x-4=6$
$2x=10$
$x=5$ | 15. $\log (\log_2 (\log_3 x)) = 0$
$x=9$ | 16. $\log_x 8 = 6$
$x^6 = 8$
$x = 1.41$ $x = \sqrt[6]{8}$ |
| 17. $9^{x+1} = 27^{2x}$
$3^{2(x+1)} = 3^{3(2x)}$
$2x+2 = 6x$
$2 = 4x \rightarrow x = \frac{1}{2}$ | 18. $\left(\frac{1}{2}\right)^{2x-3} = 4^{x+2}$
$2^{-(2x-3)} = 2^{2(x+2)}$
$-2x+3 = 2x+4$
$-1 = 4x \rightarrow x = -\frac{1}{4}$ | 19. $1000 = 10^{3+2x}$
$10^3 = 10^{3+2x}$
$3 = 3+2x$
$0 = 2x$ |
| 20. $\log_2 (\log_9 81) = \log_x 7$
$\log_2 2 = \log_x 7$
$1 = \log_x 7$
$x^1 = 7$
$x = 7$ | 21. $\log_5 (x-1) = 2$
$25 = x-1$
$26 = x$ | 22. $\log_3 (x-4) = \log_3 (2x)$
$x-4 = 2x$
$-4 = x$ |
| 23. $x^{\frac{3}{2}} = 27$
$(x^{\frac{3}{2}})^{\frac{2}{3}} = (27)^{\frac{2}{3}}$
$x = (3^3)^{\frac{2}{3}}$
$x = 9$ | 24. $2(x+1)^{\frac{4}{3}} = 32$
$\left(\frac{2}{2}\right)^{\frac{4}{3}} (x+1)^{\frac{4}{3}} = (16)^{\frac{2}{3}}$
$(x+1)^{\frac{4}{3}} = (2^4)^{\frac{2}{3}}$
$x+1 = (2^4)^{\frac{3}{4}}$
$x+1 = \pm 8$
$x = -1 \pm 8$
$x = -9$ $x = 7$ | 25. $2^4 + \log_3 81 = x + 20$
$16 + 4 = x + 20$
$20 = x + 20$
$0 = x$ |

26. To the nearest dollar, what amount must be invested at 6% compounded continuously for 14 years in order for balance to be \$23,140? ($A = Pe^{rt}$)

$$A = Pe^{rt}$$

$$23,140 = Pe^{.06(14)}$$

$$23,140 = 2.316P$$

$$9989.78 = P$$

\$9989.78

27. A tractor that 4 years ago cost \$8,000, now is worth only \$3200. Find the average annual rate of depreciation. ($y = a(1 \pm r)^t$)

$$y = a(1-r)^t$$

$$3200 = 8000(1-r)^4$$

$$0.4 = (1-r)^4$$

$$.795 = 1-r$$

$$-0.204 = -r$$

$$.2047 = r$$

20.4729%

28. The population of a certain colony of bacteria doubles every 5 hours. How long will it take for the population to triple? ($y = ab^x$)

$$y = ab^x$$

$$2 = 1(2)^{\frac{t}{5}}$$

28. A radioactive substance has a half life of 21 days. How long will it take 100 grams to become 12.5 grams?

($y = a(.5)^{\frac{t}{h}}$)

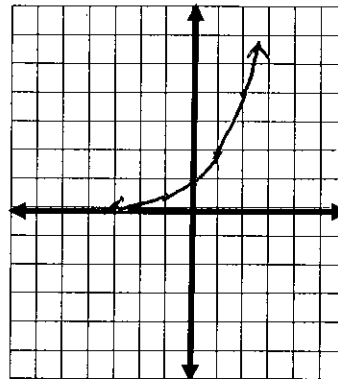
$$12.5 = 100(.5)^{\frac{t}{21}}$$

$$.125 = (.5)^{\frac{t}{21}}$$

$$\log_{.5} .125 = \frac{t}{21}$$

$$21(\log_{.5} 0.125) = t$$

$$t = 63$$



9. Graph $f(x) = 2^x$ List Domain and Range

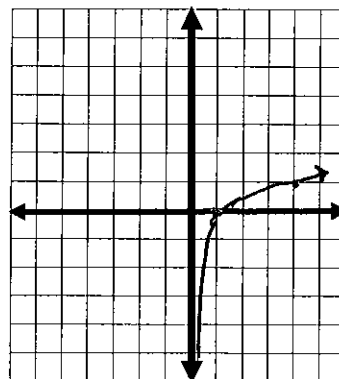
Domain: $(-\infty, \infty)$

Range: $y > 0$

30. Graph $f(x) = \log_4 x$. List Domain and Range

Domain: $x > 0$

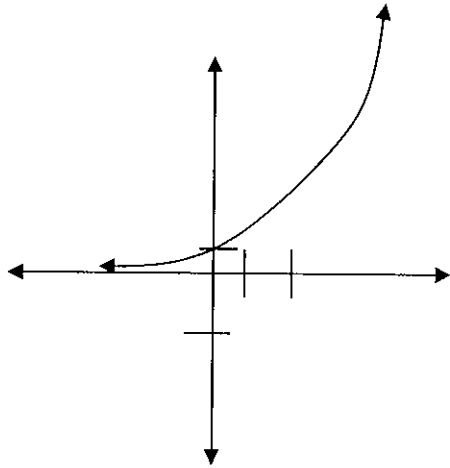
Range: $(-\infty, \infty)$



p. 24 - 25

1. $\log_x 32 = 5$ 2. $e^{\sqrt{5}} = x$ 4. -1 and -2
5. 3.9085 6. -2 7. 9 8. 3
9. $\frac{2}{3}$ 10. $\frac{1}{125}$ 11. 1 12. $\frac{2}{3}$
13. $\sqrt{3}$ 14. 5
15. 9 16. $\sqrt{2}$ 17. $\frac{1}{2}$ 18. $-\frac{1}{4}$
19. 0 20. 7 21. 26 22. -4
23. 9 24. -9 or 7 25. 0 26. \$9990
27. 20.47% 28. 28. 63 days

29.
D: \mathbb{R}
R: $y > 0$



30. D: $x > 0$
R: \mathbb{R}

