Algebra 2
Review 7.1-7.4
MCT tomorrow 7.1-7.4

7-3 Logarithms and Logarithmic Functions

25. Write $\log_2 \frac{1}{16} = -4$ in exponential form.

$$2^{-4} = \frac{1}{16}$$

26. Write $10^2 = 100$ in logarithmic form.

$\log_{10} 100 = 2$

Evaluate each expression.

27. $\log_4 256 = x$

$4^{?} = 256$

$4^x = 256$

$4^x = 4^4$

$x = 4$

28. $\log_2 \frac{1}{8} = x$

$2^{?} = \frac{1}{8}$

$2^x = \frac{1}{8}$

$2^x = \frac{1}{2^3}$

$2^x = 2^{-3}$

$x = -3$

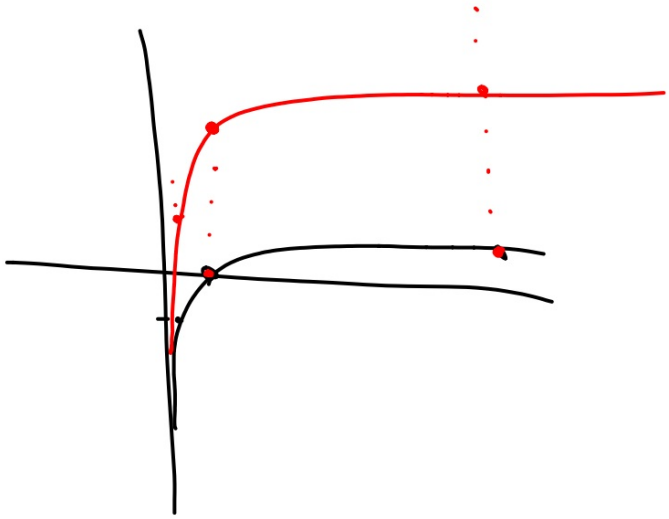
Graph each function.

29. $f(x) = 2 \log_{10} x + 4$

(one at most)

$x = 10^y$

1	0
10	1
$\frac{1}{10}$	-1



7-4 Solving Logarithmic Equations and Inequalities

Solve each equation or inequality.

31. $\log_4 x = \frac{3}{2}$

$4^{\frac{3}{2}} = x$

$8 = x$

32. $\log_2 \frac{1}{64} = x$

$2^x = \frac{1}{64}$

$2^x = \frac{1}{2^6}$

$2^x = 2^{-6}$

$x = -6$

33. $\log_4 x < 3$

$x > 3$

$x < 4^3$

$x < 64$

$3 < x < 64$

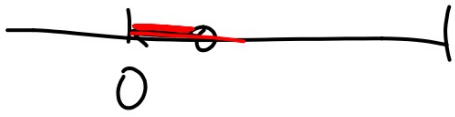
34. $\log_5 x < -3$

$x > 0$

$x \quad 5^{-3}$

$x < \frac{1}{125}$

$0 < x < \frac{1}{125}$



35. $\log_9 (3x - 1) = \log_9 (4x)$

$3x - 1 = 4x$

$-3x \quad -3x$

$-1 = x$

37. $\log_3(3x+4) \le \log_3(x-2)$

$3x+4 \le x-2$

$-x \quad -4 \qquad -x \quad -4$

$2x \le -6$

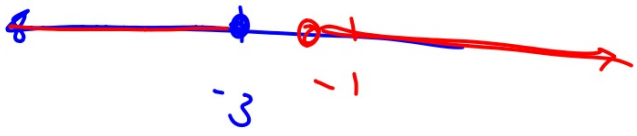
$x \le -3$

$3x+4 > 0$

$-4 \quad -4$

$3x > +4$

$\frac{3x}{3} > \frac{+4}{3}$



Write on same base

Example 2

Solve $4^{3x} = 32^{x-1}$ for x.

$$(2^2)^{3x} = (2^5)^{(x-1)}$$

$$6x = 5x - 5$$

$$-5x \quad -5x$$

$$x = -5$$

20. $64^{3n} = 8^{2n-3}$

$(8^2)^{3n} = 8^{2n-3}$ Log( )

$6n = 2n - 3$

$-2n \quad -2n$

$\frac{4n}{4} = \frac{-3}{4}$

$n = -\frac{3}{4}$

22. $9^{x-2} > \left(\frac{1}{81}\right)^{x+2}$

$(9)^{x-2} > (9^{-2})^{x+2}$

$x-2 > -2x-4$

$+2x \quad +2 \quad +2x \quad +2$

$\frac{3x}{3} > -\frac{2}{3}$

24. BACTERIA A bacteria population started with 5000 bacteria. After 8 hours there were 28,000 in the sample.

a. Write an exponential function that could be used to model the number of bacteria after x hours if the number of bacteria changes at the same rate.

b. How many bacteria can be expected in the sample after 32 hours?

$a_n = a_0(1+r)^n$

$\frac{28000}{5000} = \frac{5000(1+r)^8}{5000}$

$\sqrt[8]{5.6} = \sqrt[8]{(1+r)^8}$

$1.24 = r$

$y = 5000(2.24)^x$

$y = 5000(2.24)^{32}$

8.1×10^{14}

SGR p. 518

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