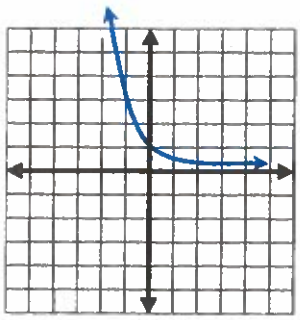
Algebra II Review
Section [redacted]
10-1 & 10-2

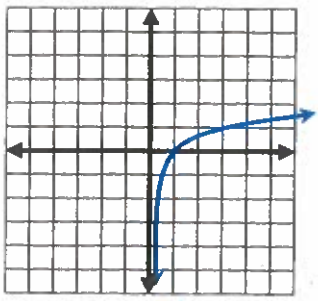
Name Key

Match the graph with the proper equation, then name the domain and range for each.

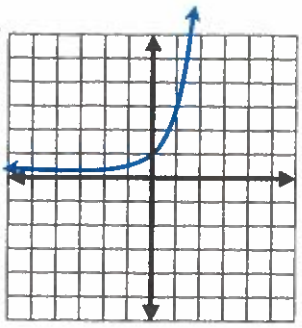
a



b



c



1) $f(x) = 3^x$

match: c

domain: all reals

range: $y > 0$

2) $f(x) = \left(\frac{1}{2}\right)^x$

match: a

domain: all reals

range: $y > 0$

3) $f(x) = \log_{10} x$

match: b

domain: $x > 0$

range: all reals

Identify which of the following functions represent exponential ***growth***, and which ones show ***decay***.

4) $f(x) = 3^x$ growth

5) $f(x) = 4(3)^x$ growth

6) $f(x) = 4(3.5)^x$ growth

7) $f(x) = 4(0.5)^x$ decay

Use the formula: $y_1 = y_0 r^{x_1 - x_0}$ to write an exponential function that passes through the given points.

8) (0, 3) & (-1, 6)

$6 = 3r^{-1}$

$2 = r^{-1}$

$\frac{1}{2} = r$

$f(x) = 3\left(\frac{1}{2}\right)^x$

9) (0, 0.2) & (1, 1.6)

$1.6 = 0.2r^1$

$1.6 = 0.2r$

$8 = r$

$f(x) = 0.2(8)^x$

Rewrite the following exponential equations in ***logarithmic*** form.

10) $2^3 = 8$

$\log_2 8 = 3$

11) $8^{-2} = \frac{1}{64}$

$\log_8 \left(\frac{1}{64}\right) = -2$

12) $\left(\frac{1}{3}\right)^2 = \frac{1}{9}$

$\log_{1/3} \left(\frac{1}{9}\right) = 2$

Rewrite the logarithmic equations in ***exponential*** form.

13) $\log_4 64 = 3$

$4^3 = 64$

14) $\log_9 3\frac{1}{2}$

$9^{1/2} = 3$

15) $\log_5 \frac{1}{25} = -2$

$5^{-2} = \frac{1}{25}$

Solve each equation.

16) $\log_{25} \frac{1}{625} = x$

$25^x = \frac{1}{625}$

$25^x = \frac{1}{25^2}$

$25^x = 25^{-2}$

$x = -2$

17) $7^{5x-12} = 343$

$7^{5x-12} = 7^3$

$5x - 12 = 3$

$5x = 15$

$x = 3$

18) $\left(\frac{1}{8}\right)^k = \left(\frac{1}{16}\right)^{k-2}$

$\left(\frac{1}{2^3}\right)^k = \left(\frac{1}{2^4}\right)^{k-2}$

$(2^{-3})^k = (2^{-4})^{k-2}$

$-3k = -4k + 8$

$k = 8$

19) $\log_b 49 = 2$

$b^2 = 49$

$b = 7$

CAN'T BE ±7, BASES ARE NOT NEGATIVE

20) $\log_7 (x^2 - 6) = \log_7 (2x + 2)$

$x^2 - 6 = 2x + 2$

$x^2 - 2x - 8 = 0$

$(x - 4)(x + 2) = 0$

$x = 4 \quad x \neq -2$

DOESN'T WORK!

21) $3^{y+10} = 9^{2y}$

$3^{y+10} = (3^2)^{2y}$

$y + 10 = 4y$

$10 = 3y$

$\frac{10}{3} = y$

Solve each inequality.

Exponential inequalities require no "extras". No "and" to solve. No number line to graph. No solution set to derive. Just solve like normal! However, keep in mind that ***logarithmic*** inequalities **DO** require the "extras".

22) $113^{4x+9} \leq 113^{2x-11}$

$4x + 9 \leq 2x - 11$

$2x + 9 \leq -11$

$2x \leq -20$

$x \leq -10$

23) $\left(\frac{1}{6}\right) > 36^{n-5}$

$6^{-1} > (6^2)^{n-5}$

$-1 > 2n - 10$

$9 > 2n$

$4.5 > n$

OR $n < 4.5$

24) $\log_9 x > 3$ and $x > 0$

$x > 9^3$

$x > 729$

(short cut for >)

25) $\log_5 (x + 4) < \log_5 (2x - 3)$

$x + 4 < 2x - 3$ AND $x + 4 > 0$

$4 < x - 3$ $\quad x > -4$

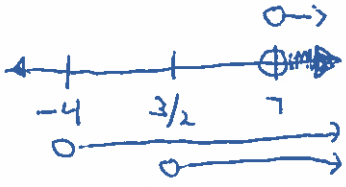
$7 < x$

$x > 7$

AND $2x - 3 > 0$

$2x > 3$

$x > 3/2$



$\{x > 7\}$

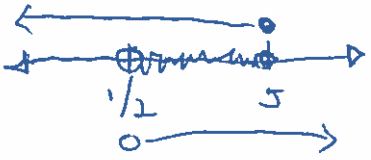
26) $\log_3 (2x - 1) \leq 2$

$2x - 1 \leq 3^2$ AND $2x - 1 > 0$

$2x - 1 \leq 9$ $\quad 2x > 1$

$2x \leq 10$ $\quad x > 1/2$

$x \leq 5$



$\{1/2 < x \leq 5\}$