

9.4 Practice - Intro to Logarithms

Rewrite each equation in exponential form.

1) $\log_{14} 196 = 2$

$$14^2 = 196$$

3) $\log_{243} 3 = \frac{1}{5}$

$$243^{\frac{1}{5}} = 3$$

5) $\log_7 49 = 2$

$$7^2 = 49$$

2) $\log_{18} 324 = 2$

$$18^2 = 324$$

4) $\log_3 243 = 5$

$$3^5 = 243$$

6) $\log_{11} \frac{1}{121} = -2$

$$11^{-2} = \frac{1}{121}$$

Rewrite each equation in logarithmic form.

7) $225^{-\frac{1}{2}} = \frac{1}{15}$

$$\log_{225} \frac{1}{15} = -\frac{1}{2}$$

8) $19^2 = 361$

$$\log_{19} 361 = 2$$

9) $7^2 = 49$

$$\log_7 49 = 2$$

10) $3^2 = 9$

$$\log_3 9 = 2$$

11) $18^{-2} = \frac{1}{324}$

$$\log_{18} \frac{1}{324} = -2$$

12) $9^{-\frac{1}{2}} = \frac{1}{3}$

$$\log_9 \frac{1}{3} = -\frac{1}{2}$$

Evaluate each expression.

13) $\log_4 16$

$$4^? = 16$$

$$\boxed{2}$$

14) $\log_6 \frac{1}{216}$

$$6^? = \frac{1}{216}$$

$$6^? = \frac{1}{6^3}$$

$$6^? = 6^{-3}$$

$$\boxed{-3}$$

15) $\log_2 16$ $2^? = 16$ $2^4 = 2^4$ 4

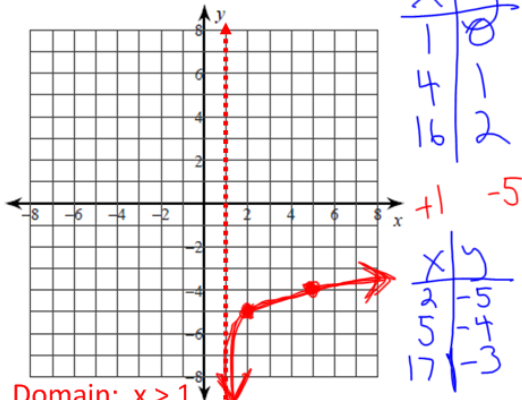
16) $\log_2 32$ $2^? = 32$ $2^5 = 2^5$ 5

17) $\log_{16} \frac{1}{2}$ $16^? = \frac{1}{2}$
 $16^? = \frac{1}{\sqrt[4]{16}}$
 $16^? = 16^{-\frac{1}{4}}$ -1/4

18) $\log_6 \frac{1}{36}$ $6^? = \frac{1}{36}$
 $6^? = \frac{1}{6^2}$ -2

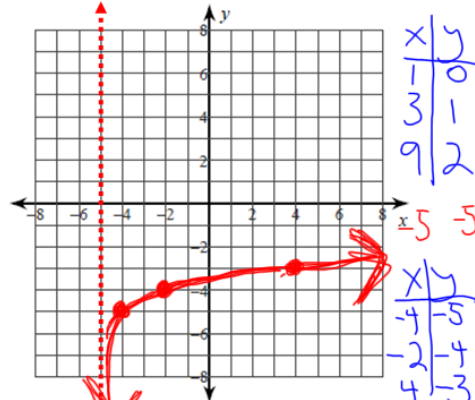
Sketch the graph and identify the domain and range of each.

19) $f(x) = \log_4 (x - 1) - 5$



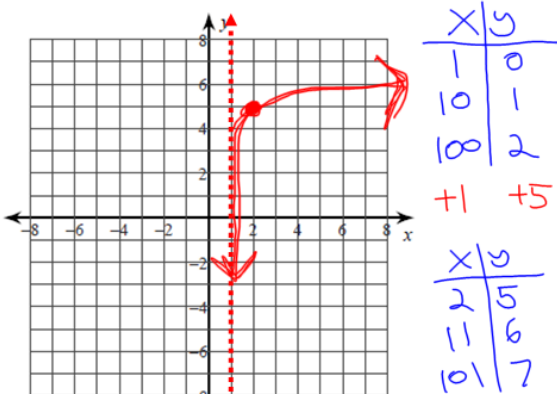
Domain: $x > 1$
 Range: all real numbers

20) $f(x) = \log_3 (x + 5) - 5$



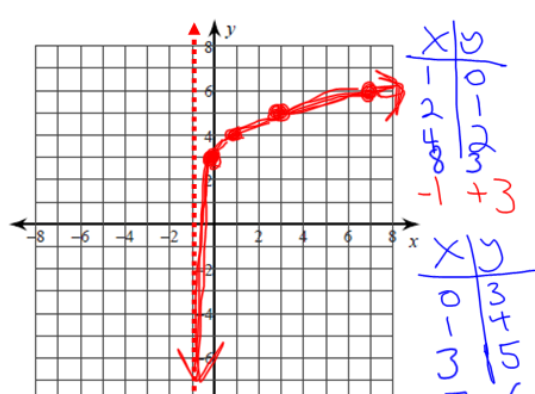
Domain: $x > -5$
 Range: all real numbers

21) $f(x) = \log (x - 1) + 5$



Domain: $x > 1$
 Range: all real numbers

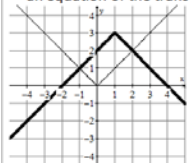
22) $f(x) = \log_2 (x + 1) + 3$



Domain: $x > -1$
 Range: all real numbers

Algebra Skills:

1. Below are graphs of $f(x) = |x|$ (thin line) and its translation (bold line). Write an equation of the translation.



$f(x) = -|x-11| + 3$

Simplify the fraction by rationalizing the denominator.

2. $\frac{5}{\sqrt{10}} = \frac{5\sqrt{10}}{\sqrt{10} \cdot \sqrt{10}} = \frac{5\sqrt{10}}{10}$

Solve by factoring.

4. $5x^3 - 10x^2 - 175x = 0$
 $5x(x^2 - 2x - 35) = 0$
 $5x(x-7)(x+5) = 0$
 $x=0, x=7, x=-5$

5. $18x^2 - 15x + 3 = 0$
 $3(6x^2 - 5x + 1) = 0$
 $3(2x-1)(3x-1) = 0$
 $x = \frac{1}{2} \text{ or } x = \frac{1}{3}$

SAT Prep:

1. Simplify: $(2^{3x})(2^{5-x})$

(A) 2^{15x-3x^2} $3x + 5 - x$
 (B) 2^{5-3x^2}
 (C) 2^{2x+5} $2x + 5$
 (D) 2^{5-2x}

2. If $f(x) = 2(4)^{x+4}$, find $f(-5)$.

$f(-5) = 2(4)^{-5+4}$
 $= 2(4)^{-1}$
 $= 2(\frac{1}{4})$
 $= \frac{2}{4} = \frac{1}{2}$

