MAC1105 College Algebra
5.2 Practice Problems

Find the domain of the logarithmic functions.

1 $f(x)=\log(x-7)$

$x-7>0$
$+7 \quad +7$
$x>7$
$(7,\infty)$

2. $g(x)=\log_2(9-x)$

$9-x>0$
$-9 \quad -9$
$\frac{-x}{-1} > \frac{-9}{-1}$
$x<9$
$(-\infty,9)$

Write the equation in its equivalent logarithmic form.

3. $5^3=125$

$\log_5 125 = 3$

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

$\log_2\left(\frac{1}{4}\right)=-2$

Write the equation in its equivalent exponential form.

5. $-1=\log_4\left(\frac{1}{4}\right)$

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

6. $\log_{25}5=\frac{1}{2}$

$25^{1/2}=5$
$\sqrt{25}=5$

Evaluate the expressions without using a calculator.

7. $\log_9 1=p$ $\log_9 1=0$

$9^p=1$
$9^0=1$
$p=0$

8. $\log_7 343=p$

$7^p=343$
$7^3=343$
$p=3$
$\log_7 343=3$

9. $\log 1{,}000{,}000=p$ $\log 1000000=6$

$10^p=1000000$
$10^p=10^6$
$p=6$

10. $\log_{81} 3=p$ $\log_{81}3=\frac{1}{4}$

$81^p=3$
$(3^4)^p=3$
$3^{4p}=3^1$
$\frac{4p}{4}=\frac{1}{4}$
$p=\frac{1}{4}$

11. $\log_5\left(\frac{1}{125}\right)=p$ $\log_5\left(\frac{1}{125}\right)=-3$

$5^p=\frac{1}{125}$
$5^p=\frac{1}{5^3}$
$5^p=5^{-3}$
$p=-3$

12. $\ln e=p$ $\ln e=1$

$e^p=e$
$e^p=e^1$
$p=1$

Graph the logarithmic functions. State the domain and range.

13. $f(x)=\log_4 x$

Inverse $y=4^x$

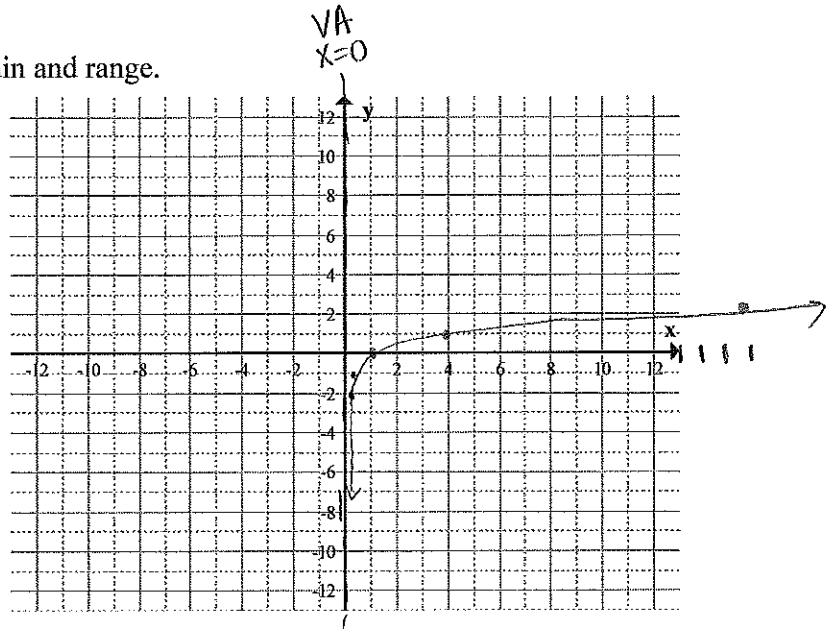
x	y
-2	$4^{-2}=\frac{1}{16}$
-1	$4^{-1}=\frac{1}{4}$
0	$4^0=1$
1	$4^1=4$
2	$4^2=16$

Points on $y=\log_4 x$

x	y
$\frac{1}{16}$	-2
$\frac{1}{4}$	-1
1	0
4	1
16	2

Domain $(0,\infty)$

Range $(-\infty,\infty)$



14. $g(x)=\log_{1/2} x$

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

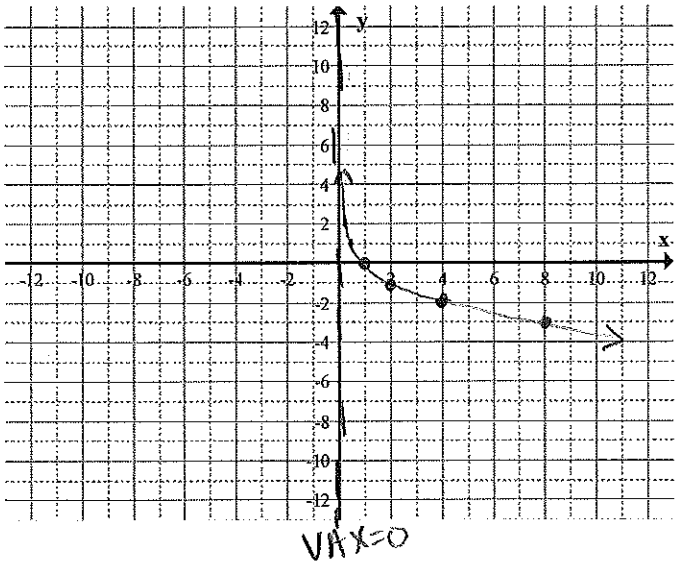
x	y
-2	$\left(\frac{1}{2}\right)^{-2}=2^2=4$
-1	$\left(\frac{1}{2}\right)^{-1}=2$
0	$\left(\frac{1}{2}\right)^0=1$
1	$\left(\frac{1}{2}\right)^1=\frac{1}{2}$
2	$\left(\frac{1}{2}\right)^2=\frac{1}{4}$

Points on $y=\log_{1/2} x$

x	y
4	-2
2	-1
1	0
$\frac{1}{2}$	1
$\frac{1}{4}$	2

Domain $(0,\infty)$

Range $(-\infty,\infty)$



15. $h(x)=-\log_2(x+5)+2$

Inverse $y=2^x$

x	y
-2	$2^{-2}=\frac{1}{4}$
-1	$2^{-1}=\frac{1}{2}$
0	$2^0=1$
1	$2^1=2$
2	$2^2=4$

Points on $y=\log_2 x$

x	y
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2

Transformations

① Shift left 5

② reflection over x-axis

③ Shift up 2

Domain $(-5,\infty)$

Range $(-\infty,\infty)$