

1. For each of the six functions, describe how its graph is a transformation of the graph of  $f(x) = \log_2(x)$ .

a.  $g(x) = \log_2 x - 5$

down 5

b.  $g(x) = 4 \log_2 x$

v. stretch of 4

c.  $g(x) = \log_2(x + 6)$

left 6

d.  $g(x) = -\frac{3}{4} \log_2 x$

v. reflection  
v. comp. of  $\frac{3}{4}$

e.  $g(x) = \log_2 x + 7$

up 7

f.  $g(x) = \log_2(x - 8)$

right 8

Identify the transformations of the graph of  $f(x) = \log_2 x$  that produce the graph of the given function  $g(x)$ . Then graph  $g(x)$  on the same coordinate plane as the graph of  $f(x)$  by applying the transformations to the asymptote  $x = 0$  and to the reference points  $(1, 0)$  and  $(b, 1)$ . Also state the domain and range of  $g(x)$  using set notation.

5.  $g(x) = 3 \log(x - 1) - 1$

v. stretch of 3  
right 1  
down 1

$g(2) = 3 \log 1 - 1$

$g(2) = -1$

$g(11) = 3 \log(11-1) - 1$   
 $3 \log 10 - 1$   
 $3 - 1$

$g(11) = 2$

6.  $f(x) = \frac{1}{2} \log_2(x - 1) - 2$

v. comp  $\frac{1}{2}$   
right 1  
down 2

$f(2) = \frac{1}{2} (\log_2(2-1)) - 2$

$f(2) = -2$

$f(3) = \frac{1}{2} \log_2(3-1) - 2$

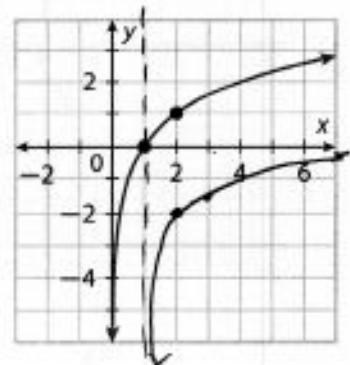
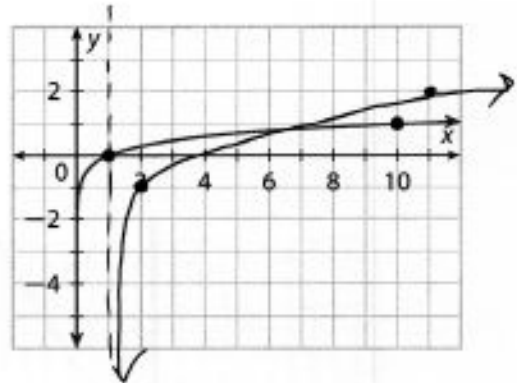
$\frac{1}{2} \log_2 2 - 2$

$\frac{1}{2} - 2$

$f(3) = -1.5$

D:  $(1, \infty)$   
R:  $(-\infty, \infty)$

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



7.  $g(x) = -4 \ln(x-4) + 3$

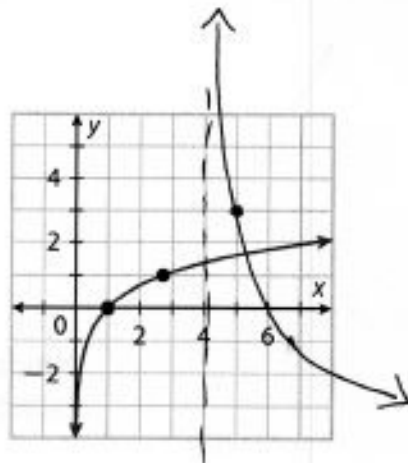
v. reflection  
v. stretch by 4  
right 4  
up 3

$g(5) = -4 \ln 1 + 3$

$g(5) = 3$

$g(6.7) = -4 \ln(2.7) + 3$   
 $= -1$

D:  $(4, \infty)$   
R:  $(-\infty, \infty)$



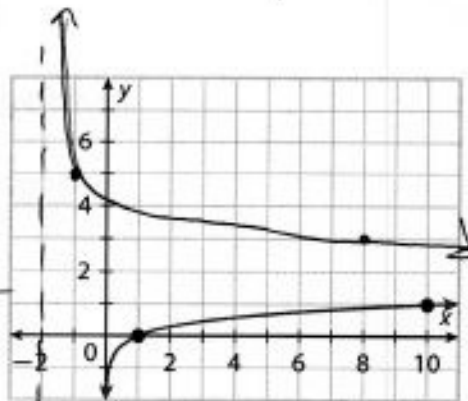
8.  $g(x) = -2 \log(x+2) + 5$

v. reflection  
v. stretch by 2  
left 2  
up 5

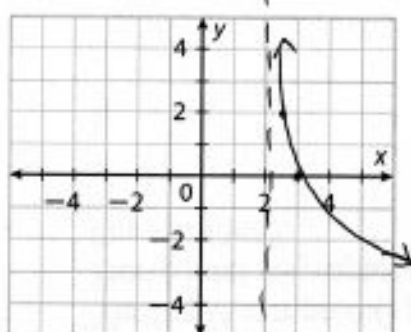
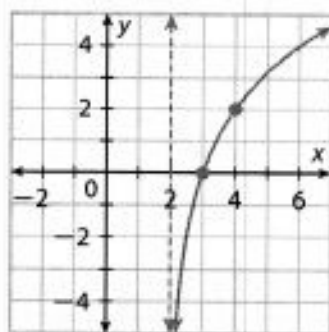
$g(-1) = -2 \log 1 + 5$   
 $= 5$

$g(8) = -2 \log_{10} 10 + 5$   
 $-2 + 5$   
 $= 3$

D:  $(-2, \infty)$   
R:  $(-\infty, \infty)$



12. Explain the Error A student drew the graph of  $g(x) = 2 \log_{1/2}(x-2)$  as shown. Explain the error that the student made, and draw the correct graph.



$f(2.5) = 2 \log_{1/2} 1/2$   
 $= 2$   
 $f(3) = 2 \log_{1/2} 1$   
 $= 0$

Review

1. If Jim invests \$3500 at 5% interest rate compounded quarterly, how much money will he have after 10 years?

$A = 3500 \left(1 + \frac{.05}{4}\right)^{4(10)} = \$5752.67$

2. Maria invests \$1250 at a 5.4% interest rate compounded continuously, how much money will she have after 6 years?

$A = 1250 e^{.054(6)} = \$1728.31$