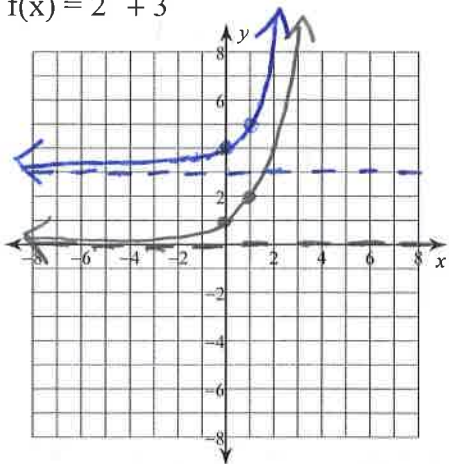


## 12.10 HW

## Graph the Function and Describe any Transformations

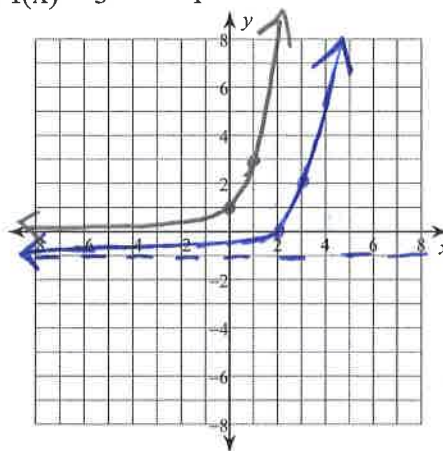
1)  $f(x) = 2^x + 3$



Transformations:

Vertical Shift up 3

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

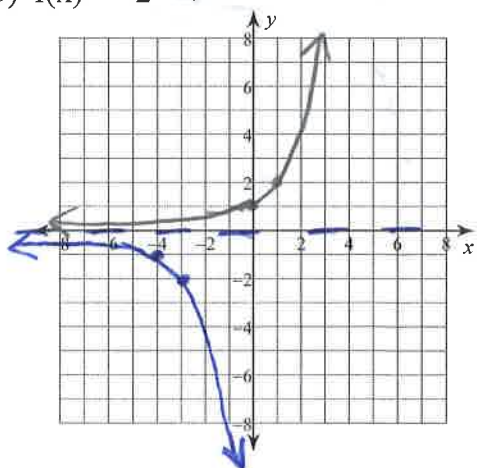


Transformations:

Horizontal shift right 2

Vertical Shift down 1

3)  $f(x) = -2^{x+4}$

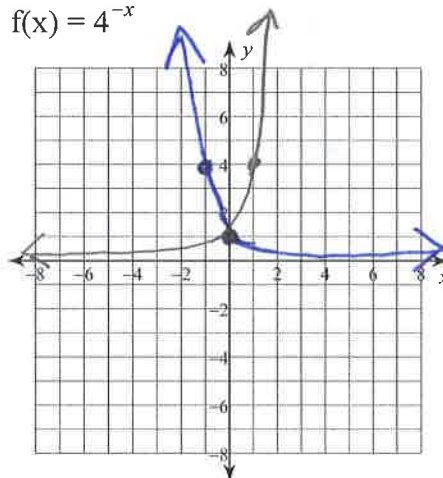


Transformations:

Horizontal shift left 4

Reflected across x-axis

4)  $f(x) = 4^{-x}$

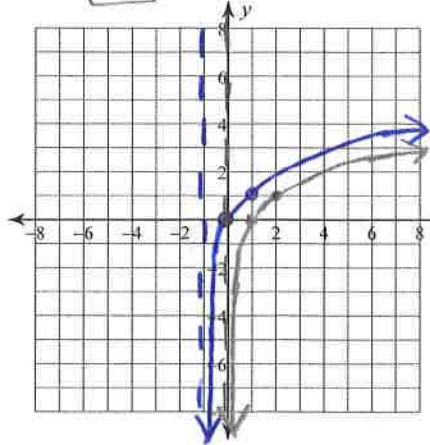


Transformations:

Reflected across y-axis

This is the inverse of  $2^x$

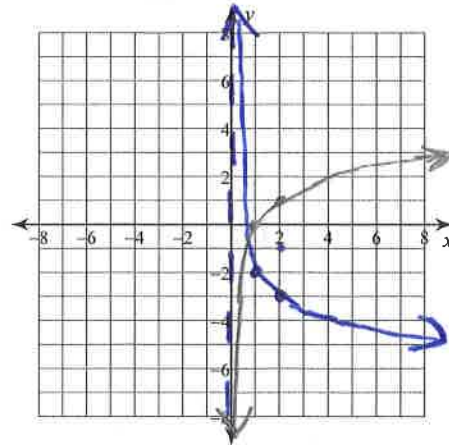
5)  $f(x) = \log_2(x+1)$



$2^x$   
(0,1)  
(1,2)  
H.A. at y=0  
V.A. at x=0  
Parent

Not in parentheses

6)  $f(x) = -\log_2 x - 2$

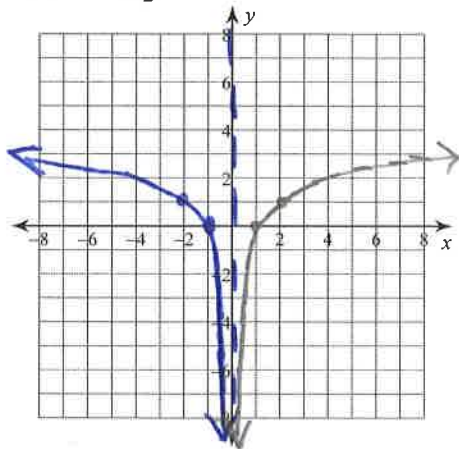


Transformations

- Horizontal shift left 1

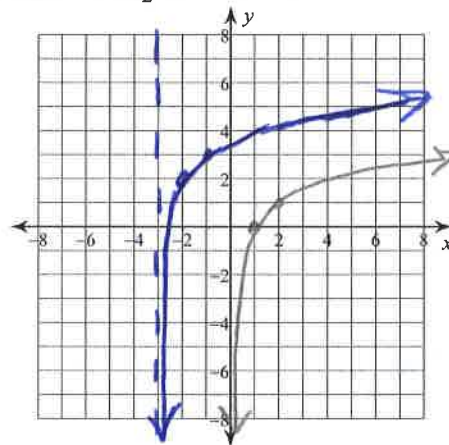
- Reflected about x-axis
- Vertical shift down 2

7)  $f(x) = \log_2 -x$



Reflected about y-axis

8)  $f(x) = \log_2(x+3) + 2$



Horizontal shift left 3  
Vertical shift up 2

$$A = P(1+r)^t \quad A = P(1-r)^t \quad A = P\left(1 + \frac{r}{n}\right)^{nt} \quad A = Pe^{rt}$$

9) You deposit \$1500 in an account that pays 5% interest yearly. How much do you have after 6 years?

$$A = \$1500(1 + .05)^6$$

$$A = \$2010.14$$

10) A mouse population is 25,000 and is decreasing in size at a rate of 20% each year. What is the mouse population after 3 years?

$$A = 25000(1 - .2)^3$$

$$A = 12,800 \text{ mice}$$

11) The population of a city grows at a rate of 5% each year. In 1990, the population was 400,000. What would be the current population? (2015)

$$A = 400,000(1 + .05)^{25}$$

$$A = 1,354,541.98$$

$$\approx 1,354,541 \text{ people}$$

In what year would the population be 1,000,000? (Use your graphing calculator table to make a prediction)

Graph  $y = 400,000(1 + .05)^t$  ← unknown

$$2009$$

X	Y
17	916807
18	962648
19	1.01E6

12) Sue deposits \$800 in an account that has an APR of 4.7%, which is compounded quarterly. How much interest will she have accrued after 12 years?

$$A = 800\left(1 + \frac{.047}{4}\right)^{4 \cdot 12}$$

$$\$601.54 \text{ in interest}$$

$$A = 1401.54$$

13) Dan deposits \$12,000 in an account that has an APR of 10%, which is compounded continuously. How much will be in his account after 7 years?

$$A = 12,000e^{(.1)(7)}$$

$$A = \$24,165.03$$

Rewrite each equation in exponential form.

14)  $\log_{17} \frac{1}{289} = -2$   $17^{-2} = \frac{1}{289}$

15)  $\log_{15} 225 = 2$   
 $15^2 = 225$

16)  $\log_{144} 12 = \frac{1}{2}$   
 $144^{\frac{1}{2}} = 12$

Rewrite each equation in logarithmic form.

17)  $\frac{13^{-1}}{8} = \frac{1}{13}$   
 $\log_{13} \frac{1}{13} = -1$

18)  $2^6 = 64$   
 $\log_2 64 = 6$

19)  $64^{\frac{1}{3}} = 4$   
 $\log_{64} 4 = \frac{1}{3}$

Evaluate each expression.

20)  $\log_5 25$   
 $\log_5 25 = 2$   
2

21)  $\log_4 \frac{1}{64}$   
 $4^y = \frac{1}{64}$   
-3

22)  $\log_2 8$   
 $2^y = 8$   
3

23)  $\log_{\frac{1}{5}} \frac{1}{5}$   
 $(\frac{1}{5})^y = \frac{1}{5}$   
1

24)  $\log_{49} 7$   
 $49^y = 7$   
 $\frac{1}{2}$

25)  $\log_5 -25$  — can't be negative!  
 Nonreal Answer

26)  $\log_4 1$   
 $4^y = 1$   
0

27)  $\log_1 36$   
 Base cannot be 1!  
 Nonreal Answer