

# HW37

## exp. transformations

> graphs 1-12 on next page

13.  $y = \frac{1}{2}^x$   
VD by 3

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

14.  $y = \frac{1}{3}^x$   
VD by 3

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

15.  $y = 4^x$   
down 3  
VD by  $\frac{1}{2}$

$$y = \frac{1}{2}(4)^x - 3$$

16.  $y = 2^x$   
over x-axis  
left + 5

$$y = -2^{x+5}$$

17.  $y = 4^x$   
over x-axis  
VD by 3  
HD by 2

$$y = -3(4)^{x/2}$$

18.  $y = 10^x$   
up 20 HD by  $\frac{1}{2}$

$$y = (10)^{2x} + 20$$

19.  $y = \frac{1}{9}^x$   
over x-axis  
HD by 2  
left + 1

$$y = -\left(\frac{1}{9}\right)^{\frac{x+1}{2}}$$

20.  $y = \frac{1}{2}^x$   
over y-axis  
right 6

$$y = \left(\frac{1}{2}\right)^{-(x-6)}$$

21.  $y = 6^x$   
down 7  
over x-axis  
VD by 2

$$y = -2(6)^x - 7$$

22.  $y = 8^x$   
up 1  
VD by 1.5  
left 3

$$y = 1.5(8)^{x+3} + 1$$

23.  $y = 9^x$   
over x-axis  
over y-axis  
up 4  
VD by 2

$$y = -2(9)^{-x} + 4$$

24.  $y = 3^x$   
over x-axis  
right 5  
VD by  $\frac{1}{2}$   
HD by  $\frac{1}{2}$

$$y = -\frac{1}{2}(3)^{2(x-5)}$$

# Exponential Transformations – Answers

