

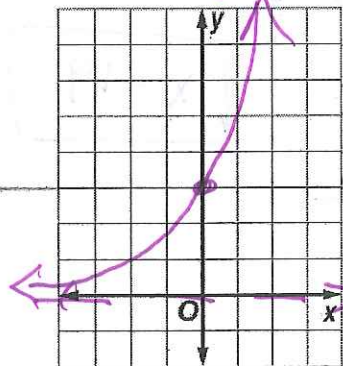
Key

7-1

Graph each function. State the domain and range.

1. $y = 3(2)^x$

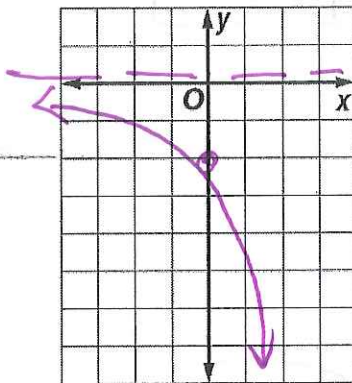
vertical stretch by 3



*D: \mathbb{R}
R: $y > 0$
asymptote $y = 0$*

2. $y = -2(3)^x$

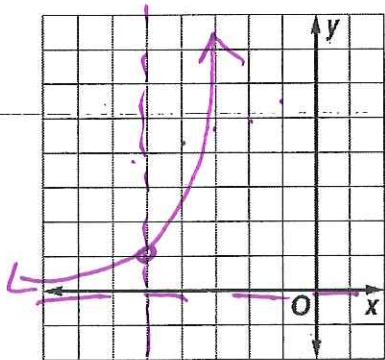
*vertical reflection
vertical stretch by 2*



*D: \mathbb{R}
R: $y < 0$
asymptote $y = 0$*

3. $y = 2^{x+5}$

5 units Left

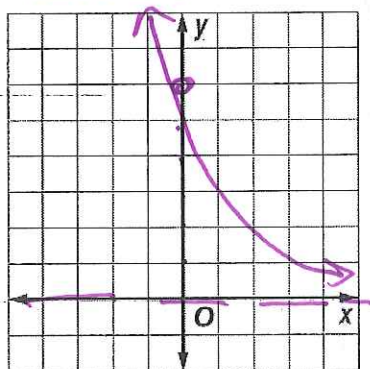


*D: \mathbb{R}
R: $y > 0$
asymptote $y = 0$*

4.

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

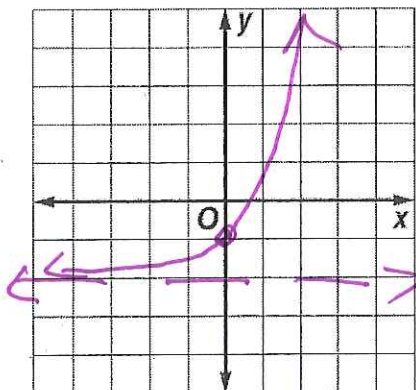
*decay
vertical stretch*



*D: \mathbb{R}
R: $y > 0$
asymptote $y = 0$*

5. $y = 4^x - 2$

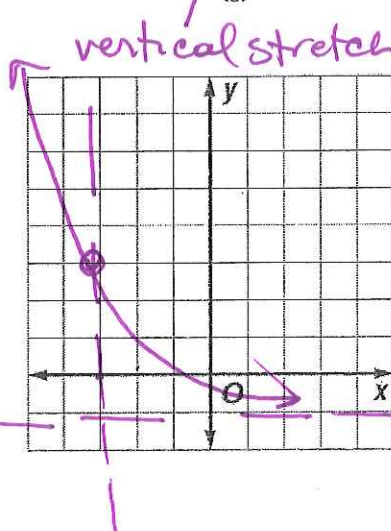
- 2 Down



*D: \mathbb{R}
R: $y > -2$
asymptote $y = -2$*

6. $y = 4\left(\frac{1}{5}\right)^{x+3} - 1$

*- 3 Left
- 1 Down*



*D: \mathbb{R}
R: $y > -1$
asymptote $y = -1$
 $y = -1$*

7-2

Solving Exponential Equations and Inequalities

Solve.

1. $9^{8x-4} = 81^{3x+6}$

$$\begin{aligned} 9^{8x-4} &= (9^2)^{3x+6} \\ 9^{8x-4} &= 9^{6x+12} \\ 8x-4 &= 6x+12 \\ -6x+4 &= -6x+12 \\ \hline 2x &= 16 \\ \frac{2x}{2} &= \frac{16}{2} \end{aligned}$$

$x=8$

2. $4^{x-5} = 16^{2x-31}$

$$\begin{aligned} 4^{x-5} &= (4^2)^{2x-31} \\ 4^{x-5} &= 4^{4x-62} \\ x-5 &= 4x-62 \\ -x+62 &= -x+62 \\ \hline 57 &= \frac{3x}{3} \end{aligned}$$

$x=19$

3. $4^{3x-3} = 8^{4x-4}$

$$\begin{aligned} (2^2)^{3x-3} &= (2^3)^{4x-4} \\ 2^{6x-6} &= 2^{12x-12} \\ 6x-6 &= 12x-12 \\ -6x+12 &= -6x+12 \\ \hline 6 &= 6x \\ \frac{6}{6} &= \frac{6x}{6} \end{aligned}$$

$x=1$

4. $9^{-x+5} = 27^{6x-10}$

$$\begin{aligned} (3^2)^{-x+5} &= (3^3)^{6x-10} \\ 3^{-2x+10} &= 3^{18x-30} \\ -2x+10 &= 18x-30 \\ +2x+30 &= +2x+30 \\ \hline 20 &= \frac{20x}{20} \end{aligned}$$

$x=1$

5. $(\frac{1}{36})^{6x-3} > 6^{3x-9}$

$$\begin{aligned} (6^{-2})^{6x-3} &> 6^{3x-9} \\ 6^{-12x+6} &> 6^{3x-9} \\ -12x+6 &> 3x-9 \\ +12x+9 &> +12x+9 \\ \hline 15 &> \frac{15x}{15} \end{aligned}$$

$x < 1$

6. $(\frac{1}{9})^{2x+7} \leq 27^{6x-12}$

$$\begin{aligned} (3^{-2})^{2x+7} &\leq (3^3)^{6x-12} \\ 3^{-4x-14} &\leq 3^{18x-36} \\ -4x-14 &\leq 18x-36 \\ +4x+36 &\leq +4x+36 \\ \hline 22 &\leq \frac{22x}{22} \end{aligned}$$

$x \geq 1$

Write an exponential function whose graph passes through the given points.

7. $(0, -1)$ and $(6, -64)$

$$\begin{aligned} y &= ab^{xy} \\ y &= -1b^x \\ -64 &= -1(b)^6 \\ \frac{-64}{-1} &= \frac{-1(b)^6}{-1} \\ b^6 &= 64 \\ \sqrt[6]{64} &= b \\ b &= 2 \\ y &= -1(2)^x \end{aligned}$$

8. $(0, 7)$ and $(-2, 28)$

$$\begin{aligned} y &= ab^{xy} \\ y &= 7b^x \\ 28 &= 7(b)^{-2} \\ \frac{28}{7} &= \frac{7(b)^{-2}}{7} \\ b^{-2} &= 4 \\ b^{-\frac{1}{2}} &= 4^{-\frac{1}{2}} \\ b^{\frac{1}{2}} &= \frac{1}{4^{\frac{1}{2}}} \\ b &= \frac{1}{\sqrt{4}} = \frac{1}{2} \\ y &= 7(\frac{1}{2})^x \end{aligned}$$