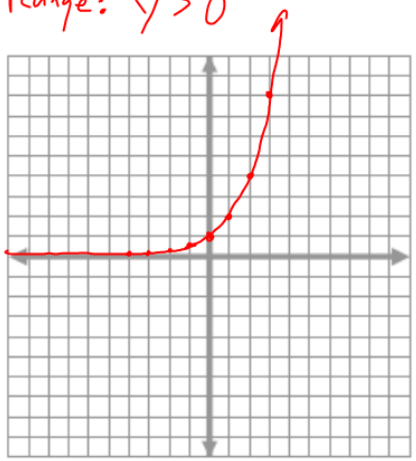
1. Sketch the graph of $y = 1(2)^x$. Then state the function's domain and range.

Domain: all real numbers
Range: $y > 0$

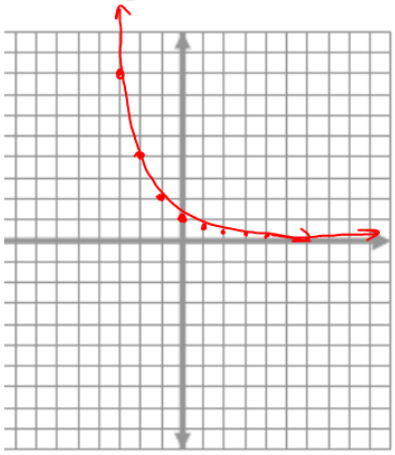
| X | Y |
|---|---|
| -4 | $2^{-4} = \frac{1}{16}$ |
| -3 | $2^{-3} = \frac{1}{8}$ |
| -2 | $2^{-2} = \frac{1}{4}$ |
| -1 | $2^{-1} = \frac{1}{2^1}$ |
| 0 | 1 |
| 1 | 2 |
| 2 | 4 |
| 3 | 8 |
| 4 | 16 |



2. Sketch the graph of $y = 1\left(\frac{1}{2}\right)^x$. Then state the function's domain and range.

$y = a(b)^x$

Dom: all real numbers
Range: $y > 0$



| X | Y |
|---|---|
| -4 | $\left(\frac{1}{2}\right)^{-4} = \frac{1^{-4}}{2^{-4}} = \frac{2^4}{1^4} = 16$ |
| -3 | $\left(\frac{1}{2}\right)^{-3} = \frac{1^{-3}}{2^{-3}} = \frac{2^3}{1^3} = 8$ |
| -2 | 4 |
| -1 | 2 |
| 0 | 1 |
| 1 | $\left(\frac{1}{2}\right)^1 = \frac{1}{2}$ |
| 2 | $\left(\frac{1}{2}\right)^2 = \frac{1^2}{2^2} = \frac{1}{4}$ |
| 3 | $\frac{1}{8}$ |
| 4 | $\frac{1}{16}$ |

$y = a(b)^x$

1. The function is continuous

2. The domain is the set of all real numbers

3. The x-axis is an asymptote of the graph

a line that a graph approaches but never touches/crosses

4. The range is the set of all positive numbers if a>0 and all negative numbers if a<0

$y>0$ $y<0$

5. The graph contains the point (0,a). The y-intercept is a.

If a>0 and b>1, the function $y = a(b)^x$ represents exponential growth

If a>0 and 0<b<1, the function $y = a(b)^x$ represents exponential decay

1 $y = 1\left(\frac{1}{5}\right)^x$

$a = 1$

$b = \frac{1}{5}$

decay

2 $y = 2(5)^x$

$a = 2$

$b = 5$

growth

3 $y = 7(0.8)^x$

decay

4 $y = 4\left(\frac{3}{2}\right)^x$

growth

1. $3^{2n+1} = 3^4$

$2n + 1 = 4$

$2n = 3$

$n = \frac{3}{2}$

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

$4x = 3x - 3$

$x = -3$

1-7, 12-17