

# Pre-Calculus 12 Exponential Functions

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The function  $y = a^x$  is an exponential function.

**General Form:**  $f(x) = a^m$ , where  $a > 0$  and  $a \neq 1$

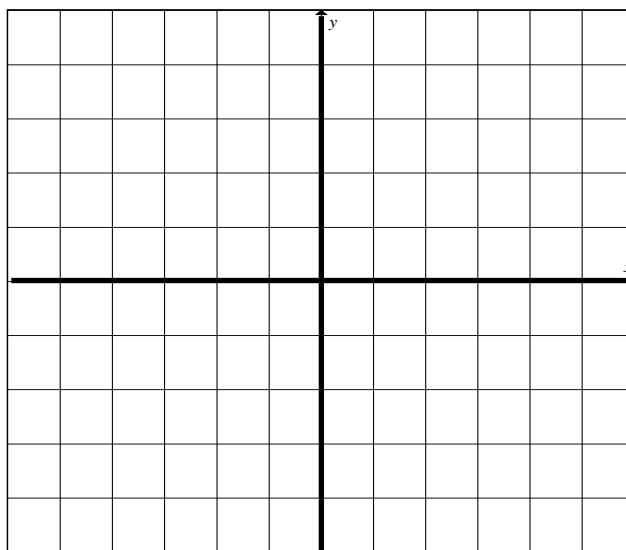
## Review Negative Exponent Law

$$a^{-n} = \frac{1}{a^n} \quad \text{or} \quad \frac{1}{a^{-n}} = a^n$$

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$$

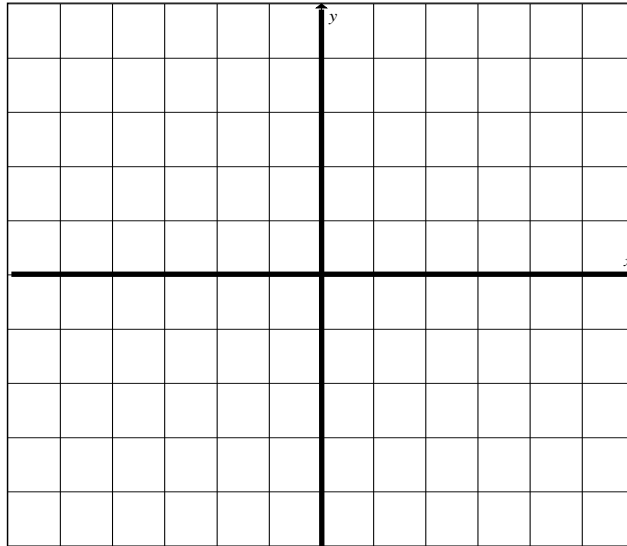
**Ex. 1)** Sketch  $y = 2^x$

x	y



Ex. 2) Graph  $y = \left(\frac{1}{2}\right)^x$

x	y

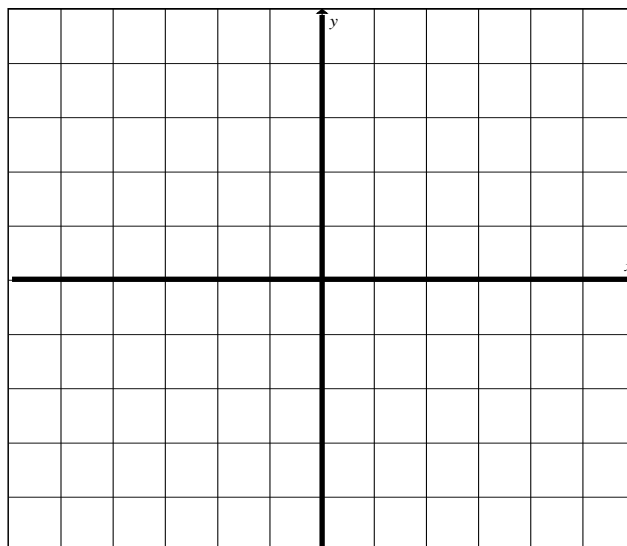


**Properties:**

- a) Zero(s)
- b) If function is increasing or decreasing (behaviour from left to right)
- c) y-intercepts
- d) Equations of any asymptotes
- e) Domain
- f) Range

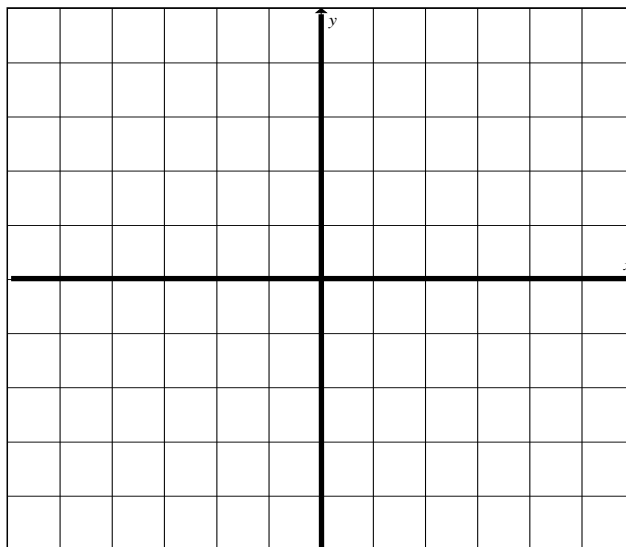
Ex. 3) Sketch  $y = 2^{-x}$

x	y

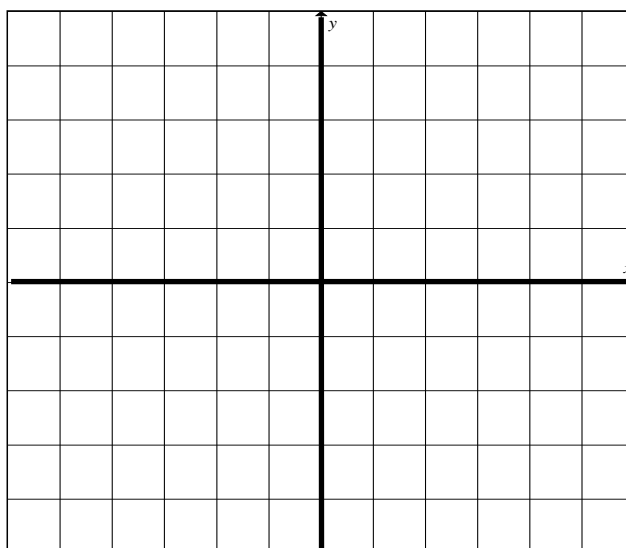


**Ex. 4)** Use transformations to sketch

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



**Ex. 5)** Sketch  $y = -2 + 3^{x+1}$



**Ex. 6)** Describe the transformations required to obtain the graph of  $y = -2(2^x)$