

Exponential Functions

 Guide Notes

Exponential Functions

An *exponential function* f is defined by the equation $y = f(x) = a^x$ where $a > 0, a \neq 1$. The domain of f is the set of all real numbers and the range of f is the set of positive numbers.

Properties of the Exponential Function in the form of $y = a^x$

- The domain of exponential function f is a set of all real numbers.
- The range of a function is a set of all positive real numbers. In the function $y = a^x$, if $a > 1$, then the graph is continuously increasing. If $0 < a < 1$, then the graph is continuously decreasing.
- The function of $y = a^x$, does not have a zero. The graph of does not intersect the x -axis.
- The function $y = a^x$ always contains the point $(0, 1)$.

Sample Problem 1: Find $f(x)$ given the value of x below.

$$y = 0.2^x$$

1. $x = -2$

2. $x = 0$

3. $x = 2$

4. $x = 4$

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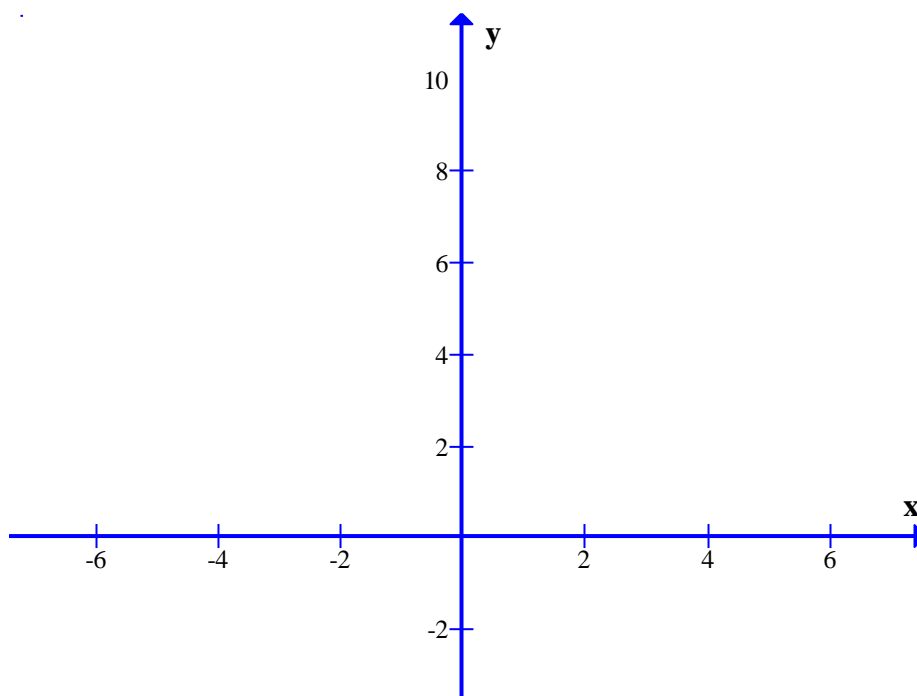
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Sample Problem 2: Draw the graph of the following function.

5. Graph the exponential function $y = \left(\frac{1}{2}\right)^x$.

x	-2	-1	0	1	2
y					

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



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6. Graph the function $y = 2^{x+1}$.

X	-2	-1	0	1	2
y					

Graph $y = 2^{x+1}$

