Sheet Title

Question Bank

NOTE: Any questions where you get a decimal or fraction as an answer can be rounded to 2 decimal places or left as an exact value.

1. For each of the following equations, fill out the corresponding table of values, plot the points on a Cartesian plane, and draw a graph of the curve. Does the graph converge on a value as $x \to \infty$ or $x \to -\infty$?

   a) $y = 2^x$

x	-3	-2	-1	0	1	2	3
y							

   b) $y = 2^{-x}$

x	-3	-2	-1	0	1	2	3
y							

   c) $y = 2^{x-1}$

x	-3	-2	-1	0	1	2	3
y							

   d) $y = 2^{\frac{x}{2}}$

x	-6	-4	-2	0	2	4	6
y							

2. For each of the following equations create a table of values and use them to graph the curves on a Cartesian plane.

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

   b) $y = -3^x$

   c) $y = 2^{x+4}$

   d) $y = 3^x - 3$

3. The graphs from question 1. b) and 2. a) should look the same. Based on their equations, $y = 2^{-x}$ and $y = \left(\frac{1}{2}\right)^x$ why do you think this could be the case?

4. For each of the following equations, plot a graph using a method you feel comfortable with. On the same plane plot the line of the horizontal asymptote (the value the curve converges upon) and state its equation.

   a) $y = 2^x - 2$

   b) $y = -2^x + 2$

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

   d) $y = \frac{2^{-x+2} + 6}{3}$

Answers

1. a)

x	-3	-2	-1	0	1	2	3
y	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

As $x \to -\infty$ the curve converges toward 0.

b)

x	-3	-2	-1	0	1	2	3
y	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$

As $x \to \infty$ the curve converges toward 0.

c)

x	-3	-2	-1	0	1	2	3
y	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4

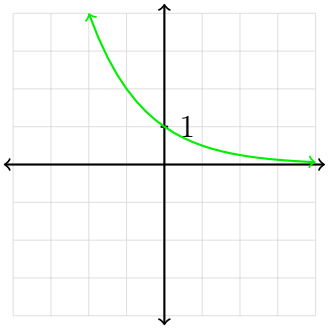
As $x \to -\infty$ the curve converges toward 0.

d)

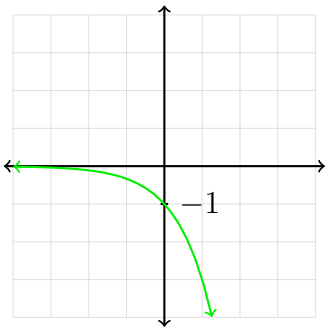
x	-6	-4	-2	0	2	4	6
y	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

As $x \to -\infty$ the curve converges toward 0.

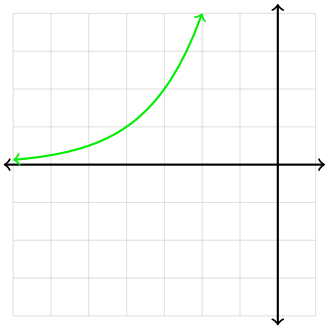
2. a) $y = \left(\frac{1}{2}\right)^x$



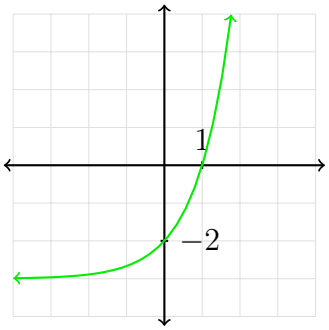
b) $y = -3^x$



c) $y = 2^{x+4}$



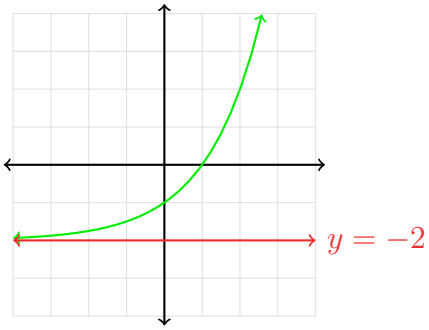
d) $y = 3^x - 3$



3. You can use index laws to show that

$$\begin{aligned} y &= \left(\frac{1}{2}\right)^x, \\ &= \frac{1^x}{2^x}, \\ &= \frac{1}{2^x}, \\ &= 2^{-x}. \end{aligned}$$

4. a) $y = 2^x - 2$ has an asymptote at $y = -2$



b) $y = -2^x + 2$

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

d) $y = \dfrac{2^{-x+2} + 6}{3}$