

**P-35** We now will study the function of  $x$  given by the equation

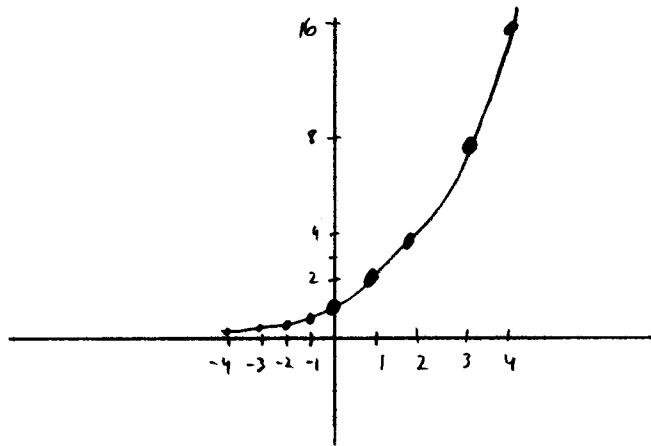
$$y = 2^x$$

where  $2^x$  is read as *two raised to the  $x^{\text{th}}$  power*. This type of function is called an *exponential function* since the  $x$  is in the exponent.

1. Complete the table below by finding the  $y$ -value for each given  $x$ -value. For example, when  $x = -1$  the  $y$ -value is  $y = 2^{-1} = \frac{1}{2}$  while when  $x = 3$  we see that  $y = 2^3 = 8$ .

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

2. Plot the nine pairs of  $(x, y)$  values from your table in Problem 1. Draw a smooth curve through your points.



3. Does the graph of  $y = 2^x$  ever go below the  $x$ -axis? no Does it ever touch the  $x$ -axis? no

4. What is the  $y$ -intercept of the graph of  $y = 2^x$ ? (0, 1)

5. As you move from left to right on your graph, does the curve you sketched rise or fall? it rises