

12.2 Graphing $y = \frac{a}{x-h} + k$ **TEKS A.1.D; 2A.10.A**

MATERIALS • graph paper • graphing calculator

QUESTION What characteristics does the graph of $y = \frac{a}{x-h} + k$ have?

EXPLORE 1 Use tables to graph a function

Graph $y = \frac{2}{x-3} + 4$ using a table.

STEP 1 Use a table

Make a table of values for $y = \frac{2}{x-3} + 4$ by choosing several integer values of x . Round the values of y , if necessary. Then plot the points.

x	0	1	2	3	4	5	6
y	3.3	3	2	undefined	6	5	4.7

STEP 2 Check close to and far from 3

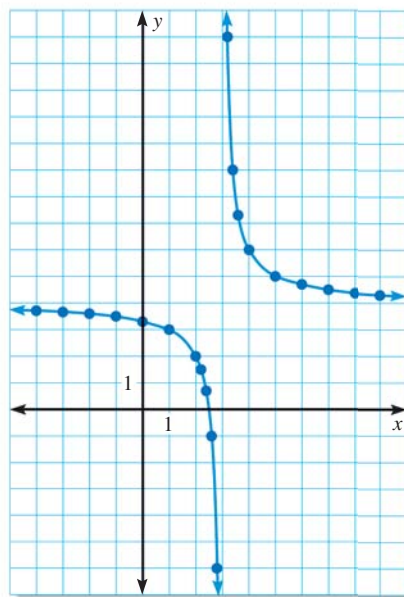
To see how the function behaves for values of x closer to 3 and farther from 3, make tables for such values and plot the points.

x	2.2	2.4	2.6	2.8	3.2	3.4	3.6
y	1.5	0.7	-1	-6	14	9	7.3

x	-4	-3	-2	-1	7	8	9
y	3.71	3.66	3.6	3.5	4.5	4.4	4.3

STEP 3 Draw a graph

Draw a smooth curve through the points (x, y) where $x > 3$. Repeat for the points (x, y) where $x < 3$.



PRACTICE

- Describe how the values of y change as the values of x get close to 3. What is the equation of the vertical asymptote?
- Describe how the values of y change as the values of x get far from 3. What is the equation of the horizontal asymptote?

Graph the function using a table.

3. $y = \frac{5}{x-4} - 6$

4. $y = \frac{-10}{x+3} - 1$

5. $y = \frac{-11}{x+13} + 9$