Assignment

LESSON 3: Samesies

Write

Define each term in your own words.

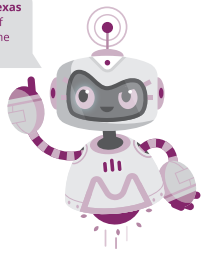
1. relation
2. function
3. function notation

Remember

Relationships between quantities can be represented in graphs, tables, equations, and contexts. Two functions are equivalent if their algebraic or graphical representations are the same.

Practice

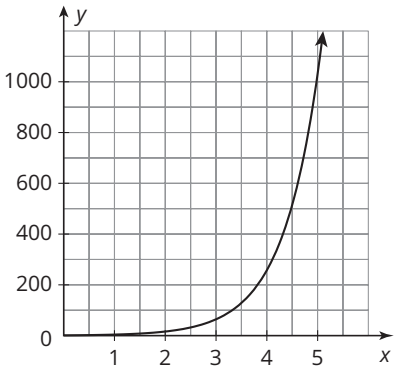
Visit **livehint.com/texas** or use this QR code if you need a hint on the Practice questions.



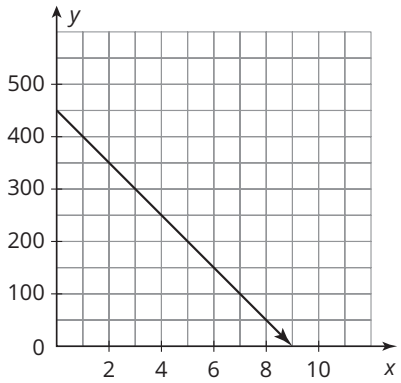
1. Consider the three scenarios given. Match each with the corresponding function, graph, and table.
   a. Juanita is driving home from her vacation spot at a constant rate. Which function, graph, and table represent her distance from home as a function of the number of hours she has traveled? Explain your reasoning.
   b. A mechanic drops a wrench from a flying helicopter. Which function, graph, and table represent the height of the wrench above the ground as a function of the time since it was dropped? Explain your reasoning.
   c. Scientists watch as a single cell divides into 4 cells over the course of an hour. During the next hour, each of the 4 new cells divides into 4 cells and the process continues. Which function, graph, and table represent the total number of cells as a function of time? Explain your reasoning.

$f(x) = -16x^2 + 1900$ $g(x) = 4^x$ $h(x) = -50x + 450$

Graph 1



Graph 2



Graph 3

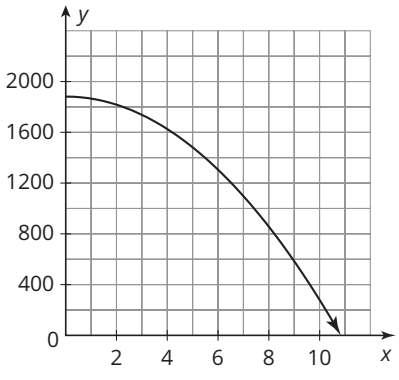


Table 1

x	*y*
0	1
1	4
2	16
3	64
4	256

Table 2

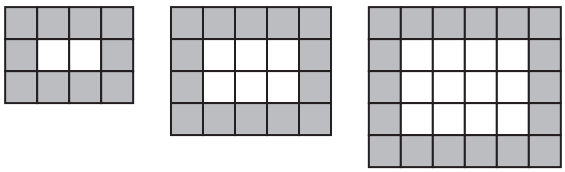
x	*y*
0	1900
2	1836
4	1644
6	1324
8	876

Table 3

x	*y*
0	450
2	350
4	250
6	150
8	50

2. Ingrid makes quilts in designs that follow a specific pattern. The first three designs are shown. In the designs, the white blocks represent blocks containing pictures while the gray blocks represent border blocks of a single color.

Design 1 Design 2 Design 3



a. Analyze the quilt designs. Describe as many patterns as you can.
b. Write the function $p(n)$ to represent the number of picture blocks in Design n.
c. Write the function $b(n)$ to represent the number of border blocks in Design n.
d. The total number of blocks in Design n can be represented by the function $t(n) = (n + 2)(n + 3)$. Use the functions you wrote to show that $t(n) = p(n) + b(n)$.
e. An art museum hires Ingrid to make one of her quilt designs to display pictures of each of their 90 paintings in 90 individual picture blocks. Which design does the art museum choose? How many total blocks are in the design?

Stretch

1. The figures shown represent a visual pattern of tiles.

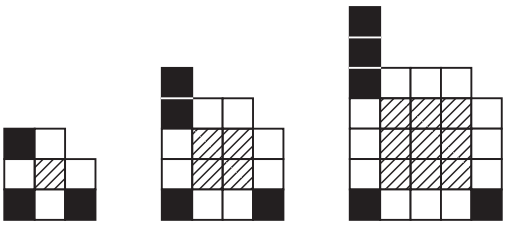


Figure 1 Figure 2 Figure 3

a. Write the function $b(n)$ to represent the number of black blocks in Figure n.
b. Write the function $w(n)$ to represent the number of white blocks in Figure n.
c. Write the function $s(n)$ to represent the number of striped blocks in Figure n.
d. The total number of blocks in Design n can be represented by the function $t(n) = \left(n + \frac{5}{2}\right)^2 - \frac{17}{4}$. Use the functions you wrote to show that $t(n) = b(n) + w(n) + s(n)$.

Review

1. A video game consists of a figure made of squares that resembles a snake. The figure gets longer in each minute of the game. The first three figures are shown.

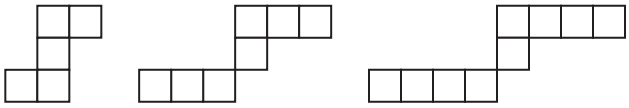


Figure 1 Figure 2 Figure 3

   a. Create a table to display the number of squares in each of the first 6 figures.
   b. Describe the pattern as linear, exponential, quadratic, or none of these. Explain your reasoning.

2. The figures shown represent a visual pattern of tiles.

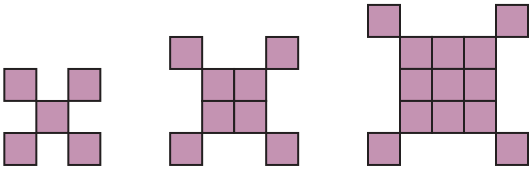


Figure 1 Figure 2 Figure 3

   a. Create a table to display the number of squares in each of the first 6 figures.
   b. Create a graph of the data points in your table on a coordinate plane. Draw a smooth curve to connect the points.
   c. Describe the pattern as linear, exponential, quadratic, or none of these. Explain your reasoning.

3. Solve the equation $-5\frac{1}{2} + 12y = \frac{1}{2}(7 - 8y)$.