

1. A function assigns to the inputs given the corresponding outputs shown in the table below.

Input	Output
3	9
9	17
12	21
15	25

- a. Does the function appear to be linear? Check at least three pairs of inputs and their corresponding outputs.
- b. Find a linear equation that describes the function.
- c. What will the graph of the function look like? Explain.

2. A function assigns to the inputs given the corresponding outputs shown in the table below.

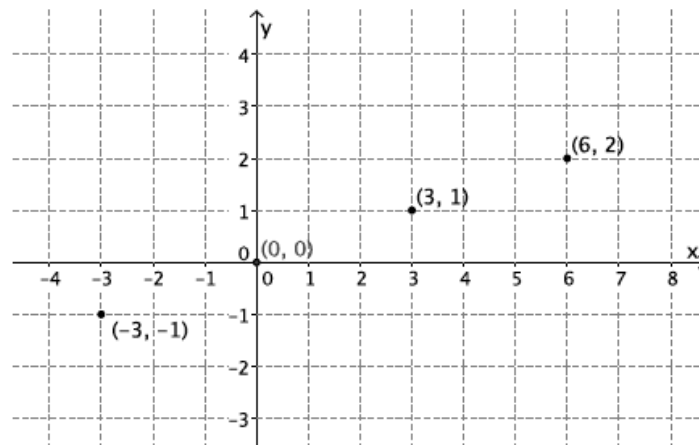
Input	Output
-1	2
0	0
1	2
2	8
3	18

- a. Is the function a linear function?
- b. What equation describes the function?

3. A function assigns the inputs and corresponding outputs shown in the table below.

Input	Output
0.2	2
0.6	6
1.5	15
2.1	21

- a. Does the function appear to be linear? Check at least three pairs of inputs and their corresponding outputs.
- b. Find a linear equation that describes the function.
- c. What will the graph of the function look like? Explain.
4. Martin says that you only need to check the first and last input and output values to determine if the function is linear. Is he correct? Explain.
5. Is the following graph a graph of a linear function? How would you determine if it is a linear function?



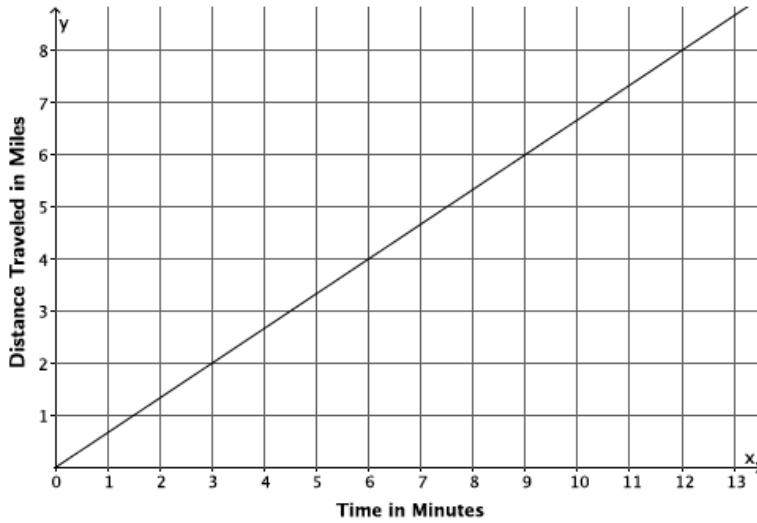
6. A function assigns to the inputs given the corresponding outputs shown in the table below.

Input	Output
-6	-6
-5	-5
-4	-4
-2	-2

- a. Does the function appear to be a linear function?
- b. What equation describes the function?
- c. What will the graph of the function look like? Explain.

1. The graph below represents the distance in miles, y , Car A travels in x minutes. The table represents the distance in miles, y , Car B travels in x minutes. It is moving at a constant rate. Which car is traveling at a greater speed? How do you know?

Car A:



Car B:

Time in minutes (x)	Distance in miles (y)
15	12.5
30	25
45	37.5

2

The local park needs to replace an existing fence that is 6 feet high. Fence Company A charges \$7,000 for building materials and \$200 per foot for the length of the fence. Fence Company B charges are based solely on the length of the fence. That is, the total cost of the six-foot high fence will depend on how long the fence is. The table below represents some inputs and their corresponding outputs that the cost function for Fence Company B assigns. It is a linear function.

Input (length of fence in feet)	Output (cost of bill in dollars)
100	26,000
120	31,200
180	46,800
250	65,000

a)

Which company charges a higher rate per foot of fencing? How do you know?

B

)At what number of the length of the fence would the cost from each fence company be the same? What will the cost be when the companies charge the same amount? If the fence you need were 190 feet in length, which company would be a better choice?

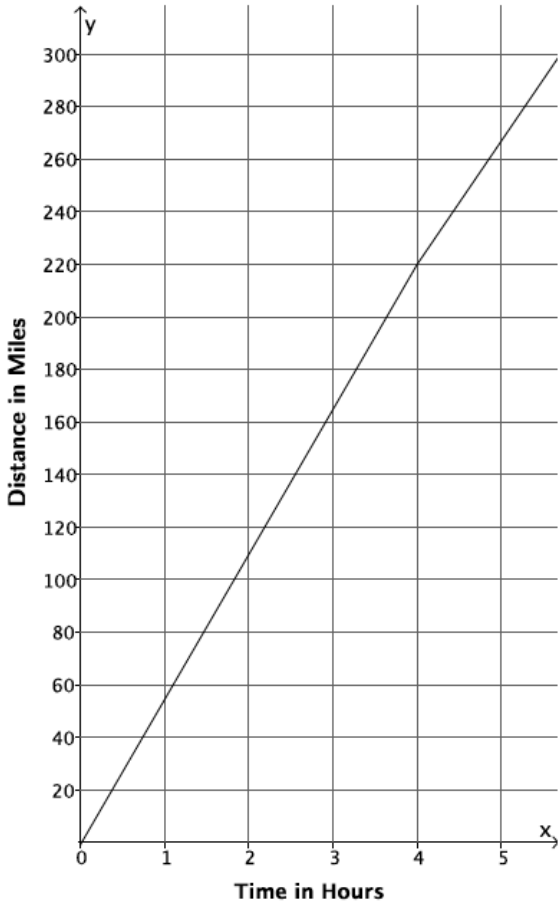
3.

The equation $y = 123x$ describes the function for the number of toys, y , produced at Toys Plus in x minutes of production time. Another company, #1 Toys, has a similar function, also linear, that assigns the values shown in the table below. Which company produces toys at a slower rate? Explain.

Time in minutes (x)	Toys Produced (y)
5	600
11	1,320
13	1,560

4.

A train is traveling from City A to City B, a distance of 320 miles. The graph below shows the number of miles, y , the train travels as a function of the number of hours, x , that have passed on its journey. The train travels at a constant speed for the first four hours of its journey and then slows down to a constant speed of 48 miles per hour for the remainder of its journey.



a. How long will it take the train to reach its destination?

b. If the train had not slowed down after 4 hours, how long would it have taken to reach its destination?

c. Suppose after 4 hours, the train increased its constant speed. How fast would the train have to travel to complete the destination in 1.5 hours?

5.

- d. A hose is used to fill up a 1,200 gallon water truck. Water flows from the hose at a constant rate. After 10 minutes, there are 65 gallons of water in the truck. After 15 minutes, there are 82 gallons of water in the truck. How long will it take to fill up the water truck? Was the tank initially empty?

1. Consider the function that assigns to each number x the value $x^2 - 4$.

a. Do you think the function is linear or nonlinear? Explain.

b. Do you expect the graph of this function to be a straight line?

c. Develop a list of inputs and matching outputs for this function. Use them to begin a graph of the function.

Input (x)	Output ($x^2 - 4$)
-3	
-2	
-1	
0	
1	
2	
3	

d. Was your prediction to (b) correct?

2. Consider the function that assigns to each number x greater than -3 the value $\frac{1}{x+3}$.

A
.Is the function linear or nonlinear? Explain.

B
.Do you expect the graph of this function to be a straight line?

C
.Develop a list of inputs and matching outputs for this function. Use them to begin a graph of the function.

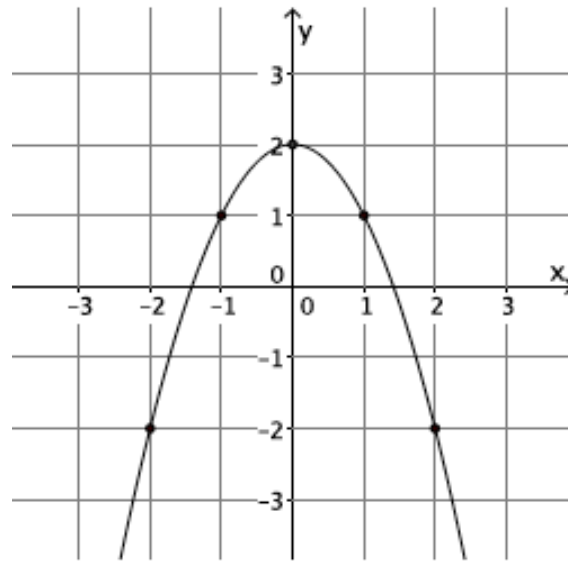
Input (x)	Output ($\frac{1}{x+3}$)
-2	
-1	
0	
1	
2	
3	

d.
Was your prediction to (b) correct?

3.

A

.Is the function represented by this graph linear or nonlinear? Briefly justify your answer.



B

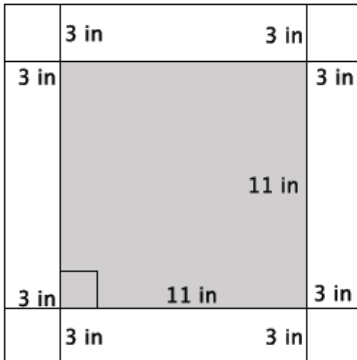
.What is the average rate of change for this function from an input of $x = -2$ to an input of $x = -1$?

c.

What is the average rate of change for this function from an input of $x = -1$ to an input of $x = 0$?

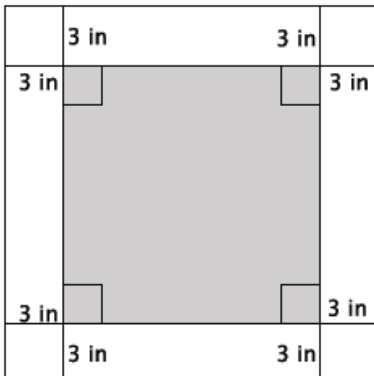
1

.Calculate the area of the 3-inch white border of the square figure below.



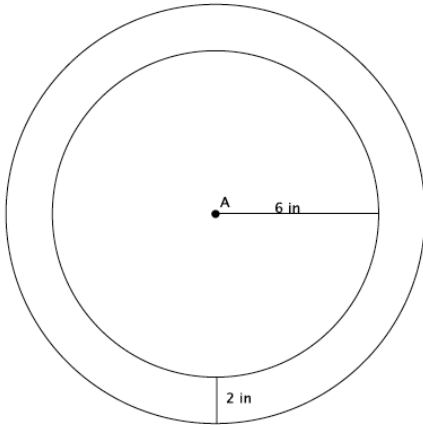
2.

Write a function that would allow you to calculate the area, A , of a 3-inch white border for any sized square picture measured in inches.



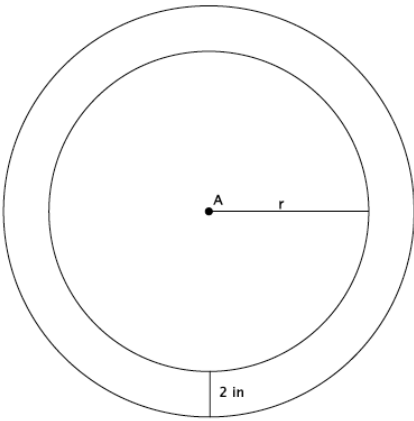
3.

Dartboards typically have an outer ring of numbers that represent the number of points a player can score for getting a dart in that section. A simplified dartboard is shown below. The center of the circle is point A . Calculate the area of the outer ring. Write an exact answer that uses π (do not approximate your answer by using 3.14 for π).



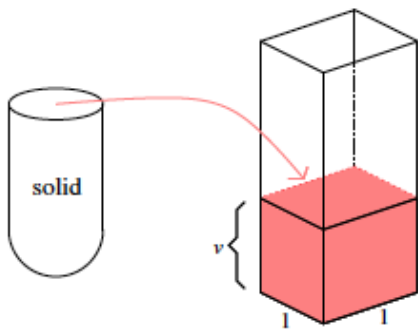
4.

Write a function that would allow you to calculate the area, A , of the outer ring for any sized dartboard with radius r . Write an exact answer that uses π (do not approximate your answer by using 3.14 for π).



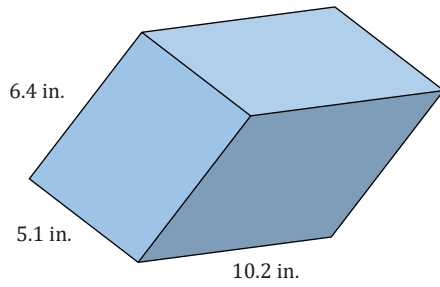
5.

The shell of the solid shown was filled with water and then poured into the standard rectangular prism, as shown. The height that the volume reaches is 14.2 in. What is the volume of the shell of the solid?



6.

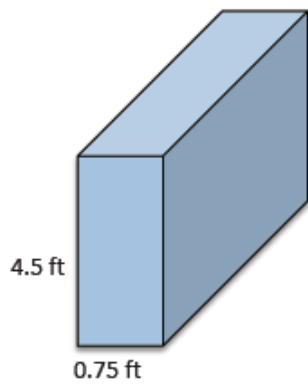
Determine the volume of the rectangular prism shown below.



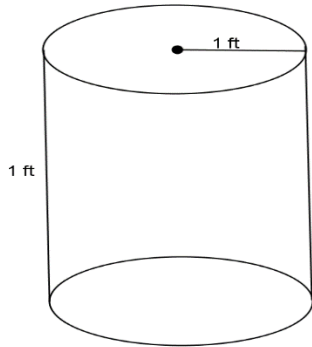
7. The volume of the prism shown below is 972 cm^3 . What is its length?



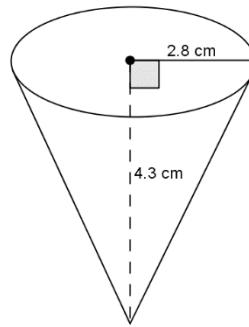
8. The volume of the prism shown below is 32.7375 ft^3 . What is its width?



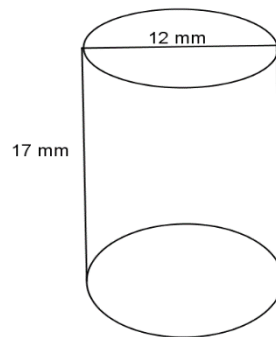
1. Use the diagram to help you find the volume of the right circular cylinder.



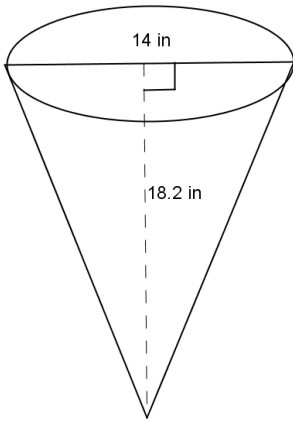
2. Use the diagram to help you find the volume of the right circular cone.



3. Use the diagram to help you find the volume of the right circular cylinder.

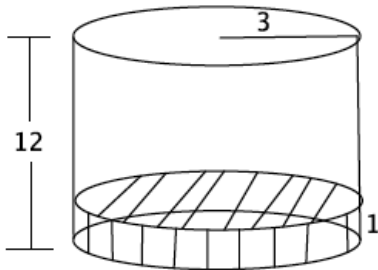


4. Use the diagram to help you find the volume of the right circular cone.



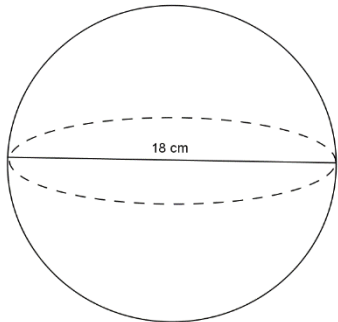
5. Oscar wants to fill with water a bucket that is the shape of a right circular cylinder. It has a 6-inch radius and 12-inch height. He uses a shovel that has the shape of a right circular cone with a 3-inch radius and 4-inch height. How many shovelfuls will it take Oscar to fill the bucket up level with the top?

6. A cylindrical tank (with dimensions shown below) contains water that is 1-foot deep. If water is poured into the tank at a constant rate of $20 \frac{\text{ft}^3}{\text{min}}$ for 20 min., will the tank overflow? Use 3.14 to estimate π .



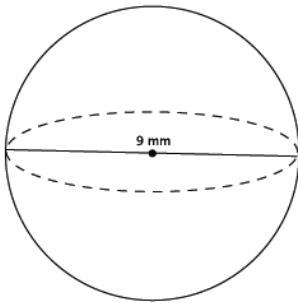
1.

Use the diagram to find the volume of the sphere.



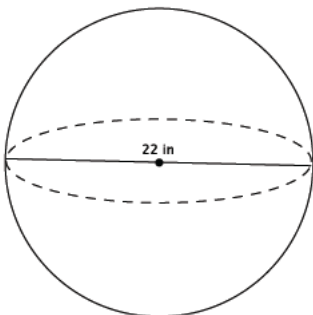
2.

Determine the volume of a sphere with diameter 9 mm, shown below.



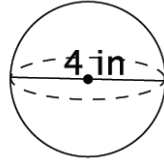
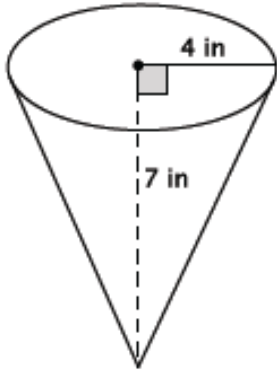
3.

Determine the volume of a sphere with diameter 22 in., shown below.



4.

Which of the two figures below has the lesser volume?



5.

Which of the two figures below has the greater volume?

