

## Working with Data: Probability and Statistics

Expected Performance 4.3a(3)

### Carnival Spinner – OE

At a carnival booth, contestants pick a color on a large spinner. A prize is won if the arrow stops on the color they pick. The spinner is divided into 8 equal sections, as shown in your answer booklet. Each section is colored green, yellow, red, or blue.

The results for a sample of spins are shown in the chart below.

Result	Number of Spins
Green	38
Yellow	58
Red	35
Blue	19

Use the results to predict the color of each of the sections on the spinner, and label each section of the spinner with the letter of a color: (G) green, (Y) yellow, (R) red, or (B) blue. Show the mathematics you used or explain how you decided how many sections should be labeled with each letter.

[2006 Released Item](#)

### Bear Cubs – OE

Maria read in the newspaper that a bear at the zoo gave birth to four female cubs and one male cub. To estimate the probability that at least four of five cubs would be female, Maria conducted the following simulation.

**STEP 1: Toss 5 coins. "Heads (H)" will represent a female cub and "Tails" (T) will represent a male cub.**

**STEP 2: Repeat this simulation 20 times.**

The results of Maria's simulation are shown below.

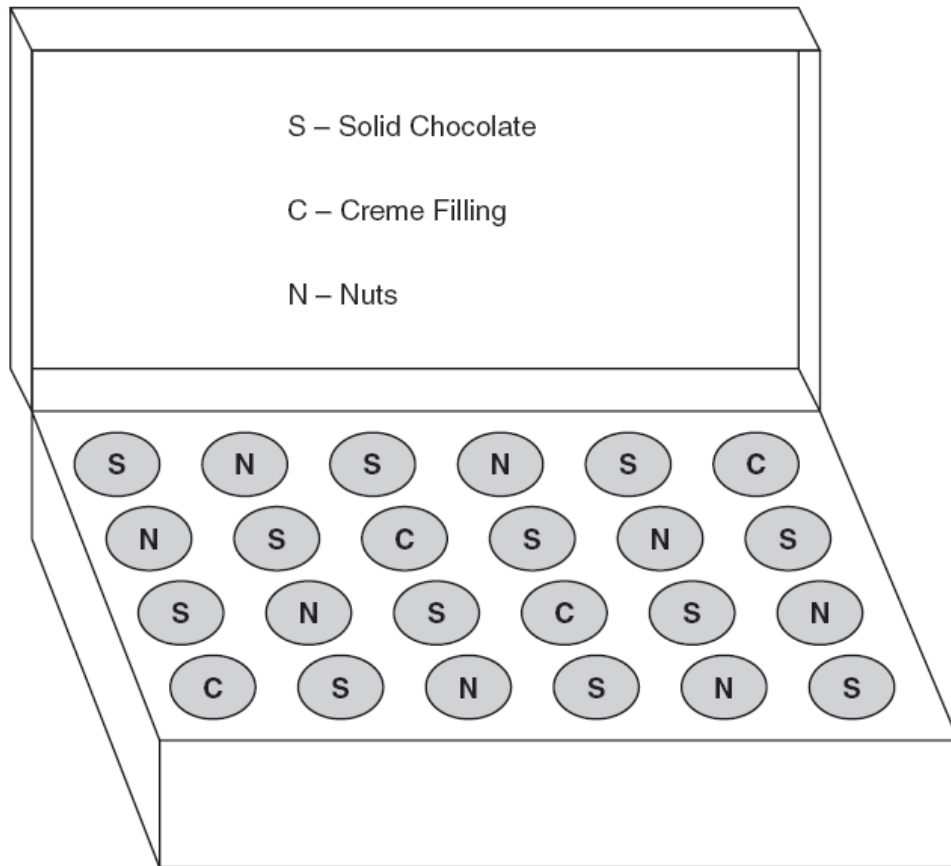
HTHHT	HHHTH	TTHTT	THTTH	THHHT
TTHTT	THHHH	HTHTH	THHTT	TTTHH
THHTT	HTHTT	THTHT	TTTTT	THTHH
HTHHT	THTTH	HTTHH	HTHTH	HHHHT

Based on the results of Maria's simulation, what is the probability that at least four of five cubs would be female?

[2003 Released Item](#)

## Chocolate Candy – OE

Below is a picture of a box of chocolate candies.



- If Malik chooses a piece of the candy at random, what is the probability that it is solid chocolate? Show your work or explain how you found your answer.
- Malik eats a total of 4 pieces of candy, 2 with nuts, 1 solid chocolate, and 1 with cream filling. He then gives the box to Fatima. If Fatima wants a piece of candy with nuts, what is the probability that she will pick one? Show your work or explain how you found your answer.
- Fatima also eats 4 pieces of candy and then gives the box to Samira. If the probability of Samira selecting a piece of candy with cream filling is 0.1875, how many cream-filled candies did Fatima eat? Show your work or explain how you found your answer.

## Working with Data: Probability and Statistics

Expected Performance 4.3a(2)

### Katharine Hepburn – GI

Meryl Streep is an actress whose career record for nominations and wins may one day rival Katharine Hepburn's.

Career of Meryl Streep

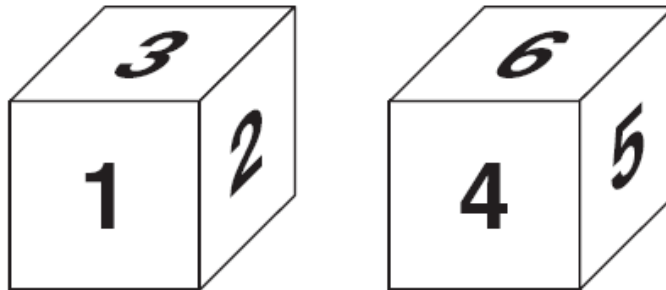
Decade	Number of Films Made	Number of Oscar Nominations	Number of Oscars Won
1970–79	9	1	0
1980–89	15	7	2
1990–99	17	3	0

Based upon Streep's record so far, what is the probability that she will win an Oscar the next time she is nominated? Express your answer as a decimal.

[2001 Released Item](#)

### Mary's Number Cubes – GI

Mary rolls two number cubes with sides numbered from 1 to 6.



If she rolls a 3 on one of the cubes, what is the probability that the sum of the numbers facing up on both cubes is greater than or equal to 5? Express your answer as a decimal rounded to the nearest hundredth.

[2007 Released Items](#)

## Katharine Hepburn – GI

Connecticut native Katharine Hepburn was nominated for a record 12 Best Actress Oscars and has won the award 4 times. The table below gives some information about her career. Use it to answer questions 18 and 19.

Career of Katharine Hepburn

Decade	Number of Films Made	Number of Oscar Nominations	Number of Oscars Won
1930–39	15	2	1
1940–49	11	2	0
1950–59	8	4	0
1960–69	3	3	2
1970–79	9	0	0
1980–89	8	1	1
1990–99	9	0	0

1. For the 10-year period from 1930 through 1939, Hepburn averaged one film every  $M$  months. What is the value of  $M$ ?

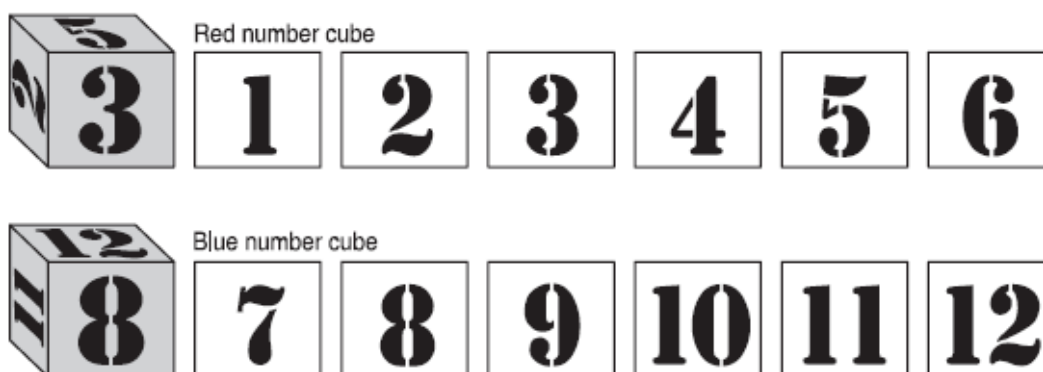
[2001 Released Item](#)

## Working with Data: Probability and Statistics

Expected Performance 4.3a(1)

### Sum of the Toss – OE

Larry has 2 six-sided number cubes, one red and one blue. The faces of one of them are numbered 1 through 6, and the faces of the other are numbered 7 through 12. Larry will toss the two cubes at the same time and find the sum of the two numbers that appear on the top faces.



On Larry's first toss, what is the probability that the sum will be a prime number? Show or explain how you got your answer.

[2002 Released Item](#)

## Working with Data: Probability and Statistics

Expected Performance 4.2a(3)

### Joseph's Final Grade – GI

Joseph's final averages in science class are shown in the table below. What is the minimum score Joseph can get on the final exam in order to receive at least a 90 for his final grade?

	Homework	Quizzes	Tests	Final Exam
% Toward Final Grade	20	20	40	20
Average	93	92	85	?

[2007 Released Item](#)

### Danbury Temperatures – OE

During a 10-day period, the daily high temperatures in Danbury were:

43°F, 45°F, 55°F, 51°F, 55°F, 49°F, 42°F, 53°F, 51°F, 55°F

- Find the three measures of central tendency (mean, median, and mode) for the set of temperatures.
- If the temperature on the 11th day was 82°F, which measure of central tendency would change the most? Show your work or explain how you found your answer.

[2005 Released Item](#)

### Website Visitors – GI

The table below shows the number of visitors to the Internet sales company the last five months.

Month	Number of Visitors
April	3,526
May	2,377
June	12,035
July	5,350
August	8,018

What is the median number of visitors over the 5-month period?

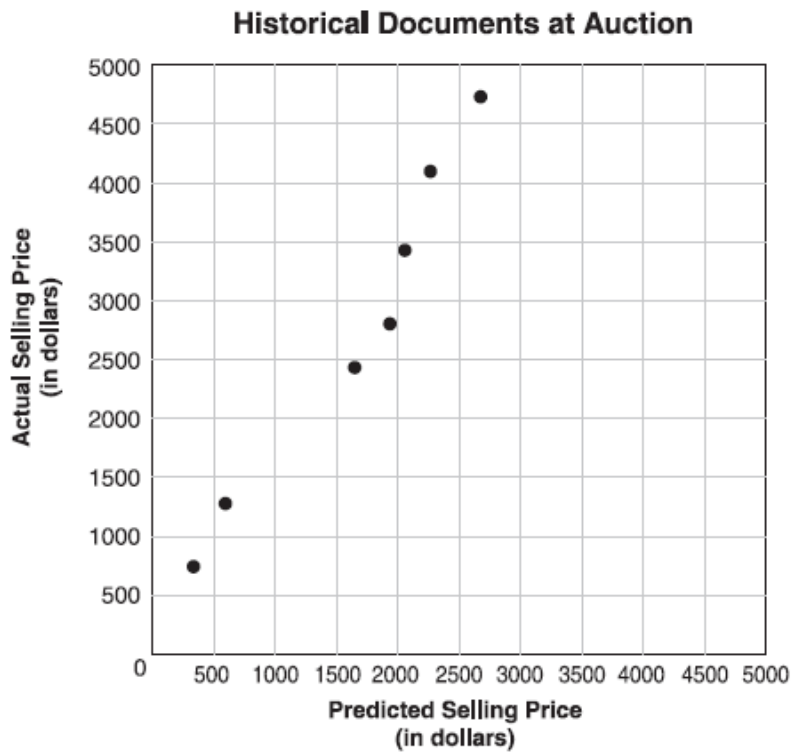
[2002 Released Item](#)

# Working with Data: Probability and Statistics

Expected Performance 4.2a(1)

## Historical Documents – GI

A financial analyst was asked to predict selling prices for some historical documents that would be sold at an auction. The scatterplot below shows the analyst's predicted price compared to the actual selling price for seven different items.



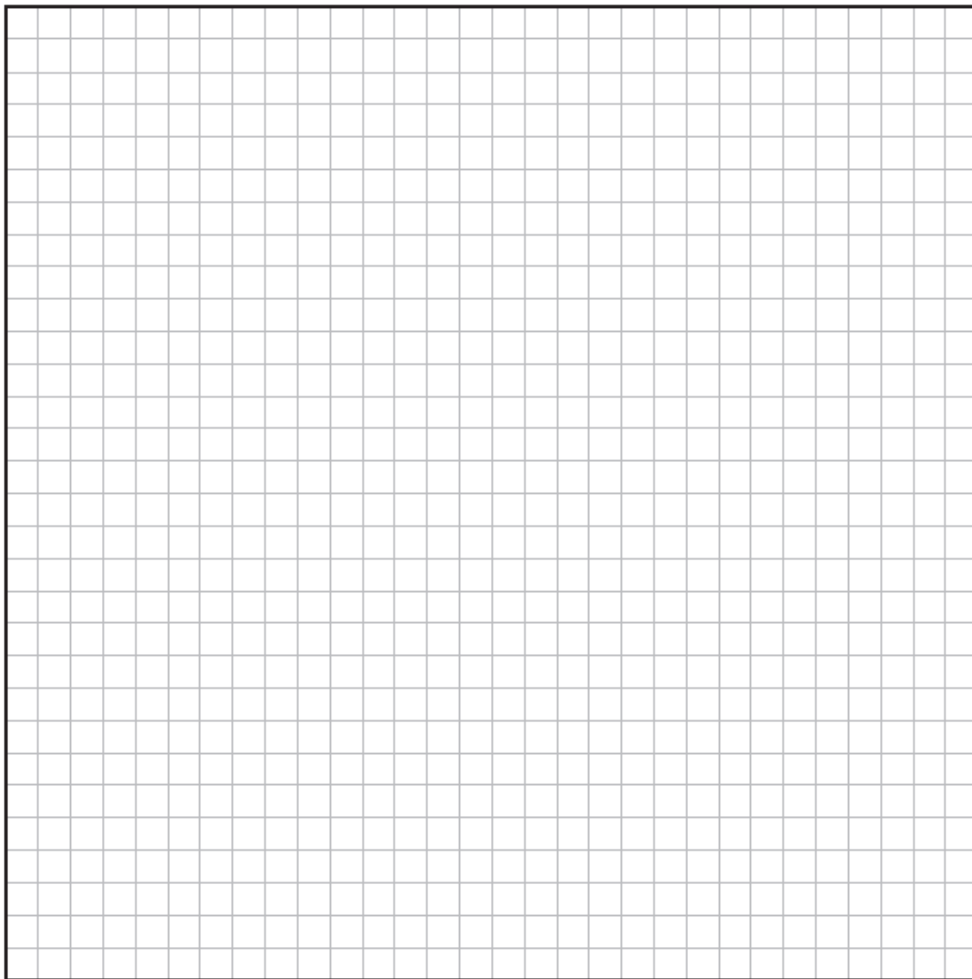
Based on the trend shown in the graph, what selling price should be expected for an item predicted to sell for \$1000?

## Population of New London County – OE

The table below shows the population of New London County, Connecticut, from 1950 to 2000.

Year	Population
1950	145,000
1960	186,000
1970	230,000
1980	238,000
1990	255,000
2000	259,000

- Make a scatter plot of the data. Be sure to label the axes.
- Make a reasonable prediction for the population in New London County in 2010. Explain how you found your answer.



# Working with Data: Probability and Statistics

Expected Performance 4.1a(1)

## Frog Population – OE

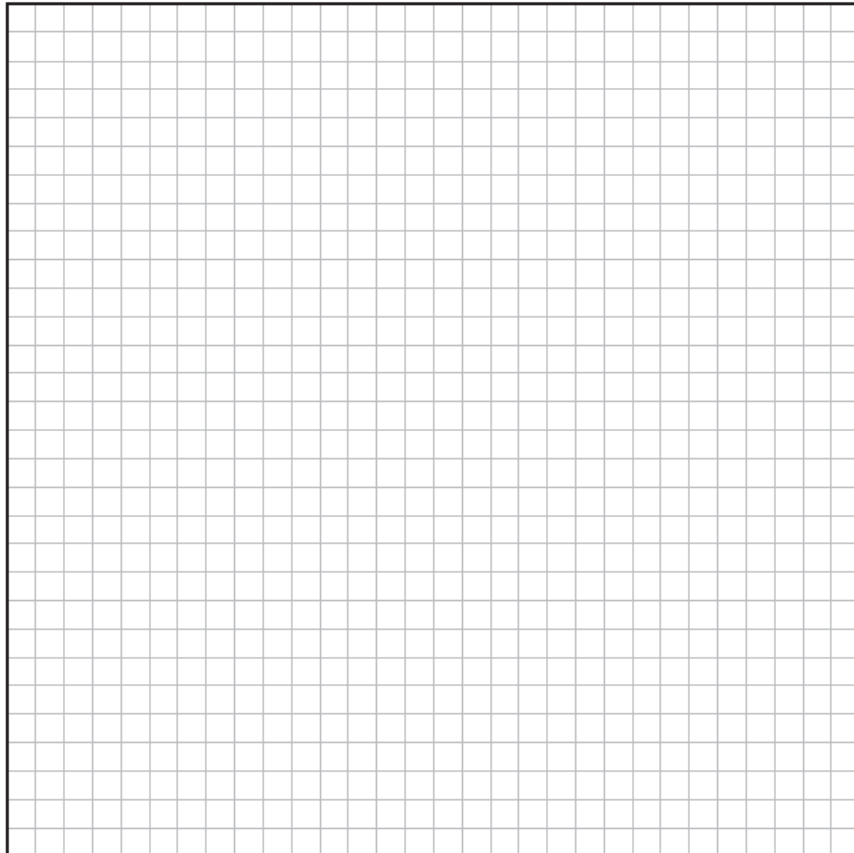
A biologist conducted a study of the population of frogs in a large pond near Norwich. The population has been decreasing as shown in the table below.

Frog Population

Year	Population
2000	2141
2001	2010
2002	1891
2003	1778
2004	?

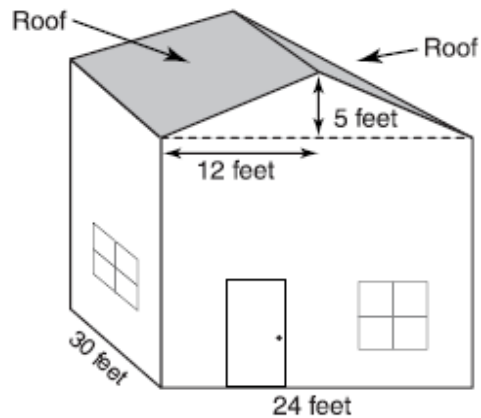
On the grid provided in your answer booklet, make a scatter-plot that shows the information from the table. Be sure to title your graph, choose an appropriate scale and label your axes.

Based on the pattern in the table or on your graph, what will be the approximate frog population in 2004? Show your work or explain how you found your answer.



## Building a Cabin - OE

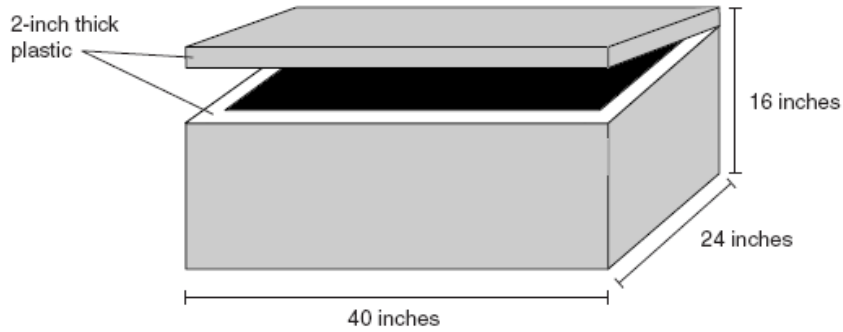
Jane is planning to build a cabin that measures 30 by 24 feet.



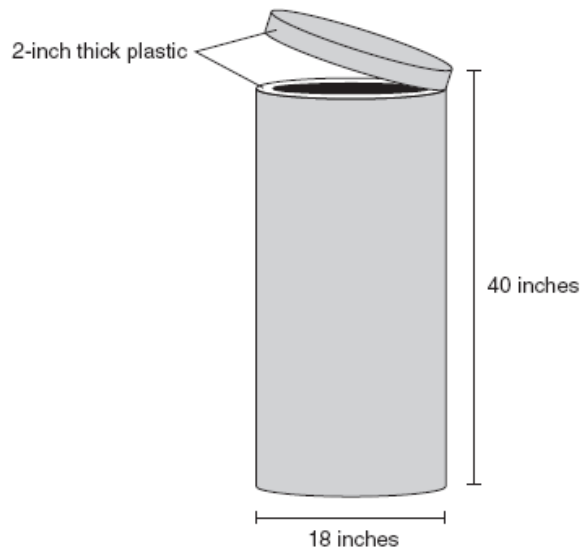
- What will be the area of the roof (shaded)? Show your work or explain how you found your answer.
- A package of shingles costs \$25 and will cover a 10-foot by 10-foot area. How much will it cost for enough packages of shingles to cover the roof? Show your work or explain how you found your answer.

## Ice Chest Capacities – GI

One ice chest is shaped like a rectangular prism with the exterior dimensions shown below.



A second ice chest is shaped like a cylinder with the exterior dimensions shown.



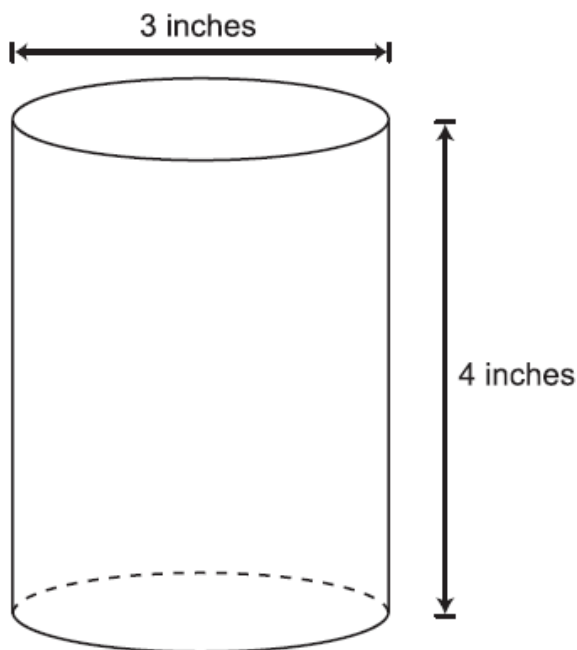
The bottom, sides, and top of both ice chests are made of plastic that is 2 inches thick. Which of the two chests would hold the most ice? Show or explain your reasoning.

## Measurement & Geometry

Expected Performance 3.3a(4)

### Soup Cans – GI

Latitia's Foods is introducing a new line of soups. The soups will be sold in cans that are 4 inches tall and have a diameter of 3 inches. The labels will wrap around the entire outside of each can, excluding the top and bottom.



Determine the area of the label. Round your answer to the nearest tenth of a square inch.

[2007 Released Item](#)

### City Construction – GI

The city ran a contest to create a sculpture for the park. The winning design was a bronze prism. The area of the octagonal base of the prism is 7 square feet and the height of the prism is 14 feet. What is the volume of the prism in cubic feet?

[2001 Released Item](#)

# Measurement & Geometry

Expected Performance 3.3a(3)

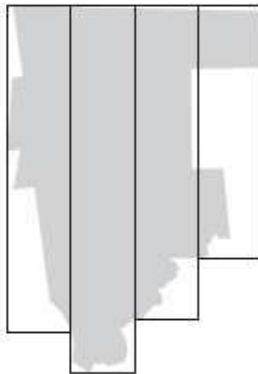
## Land Area of Tolland County – OE

Use your centimeter ruler to help you answer this question.

Molly wanted to estimate the area of Tolland County in Connecticut. She made two copies of the outline of the county at a scale of 1 centimeter to 10 kilometers.



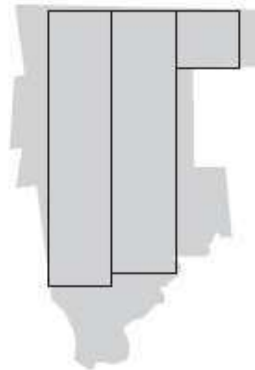
- a. To make her first estimate, Molly drew 4 rectangles that completely enclosed the outline of the county as shown and found the total area of the rectangles.



1 centimeter represents 10 kilometers

What should Molly's first estimate be?  
Show or explain how you got your answer.

- b. To make her second estimate, Molly drew 3 rectangles that were completely inside the outline of the county as shown and found the total area of the rectangles.



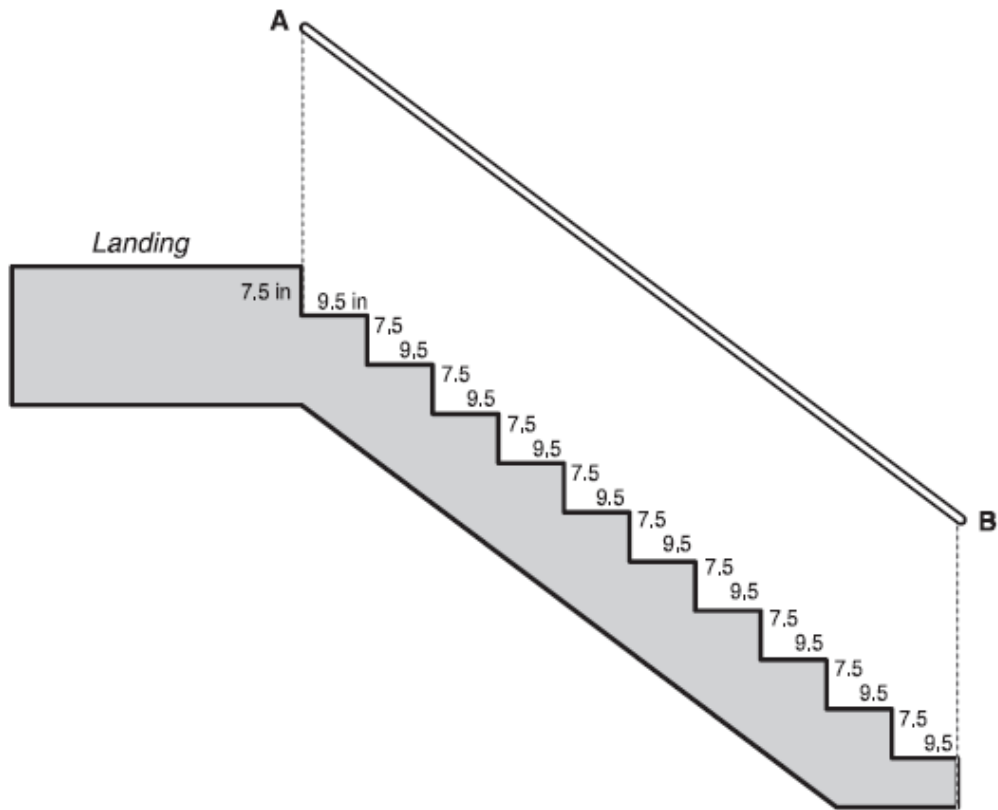
1 centimeter represents 10 kilometers

What should Molly's second estimate be?  
Show or explain how you got your answer.

- c. Molly wants to use her first two estimates of the area of Tolland County to make a final, more accurate estimate. How would you use Molly's two estimates to make a more accurate estimate? Show or explain how you got your answer.

## Stair Railing – OE

Thuan plans to add a railing parallel to a flight of stairs that goes down to the cellar in his house. The stairs have the dimensions shown in the sketch below.



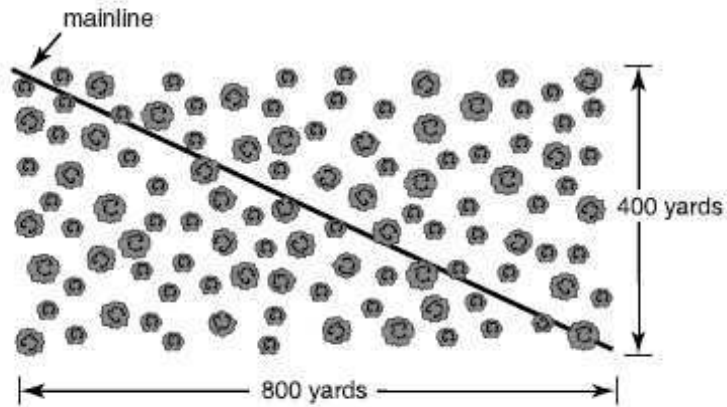
What will be the length of the railing from Point A to Point B? Show or explain how you got your answer.

# Measurement & Geometry

Expected Performance 3.3a(2)

## Maple Syrup – GI

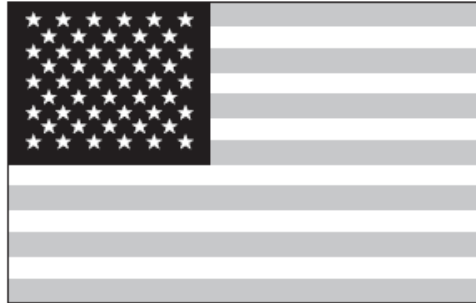
The diagram shows a grove of maple trees that is roughly rectangular in shape. The sap is collected by a network of plastic tubing that connects each tree to the **mainline**, which runs diagonally from one corner of the grove to the opposite corner.



Based on the measures in the diagram, what is the length of the mainline to the nearest yard?

## American Flag – OE

The picture below is a scale drawing of an actual American flag. The stars and some of the stripes are white. The background behind the stars is blue, and the darker stripes are red.



Estimate the percent of the flag that is red. Show your work or explain how you determined your estimate.

[2003 Released Item](#)

## Cargo Ship – OE

Use your ruler to help you answer this question.

The captain of a cargo ship plans to leave Genoa and travel to Naples, Palermo and Cagliari before returning to Genoa as shown on the map of Italy below.



The distance from Naples to Palermo is 320 kilometers. The ship's average speed is 14 nautical miles per hour. **Estimate** the number of hours it will take the cargo ship to complete its round trip, not including stops at ports. Show your work or explain how you found your answer.

[2007 Released Item](#)

# Measurement & Geometry

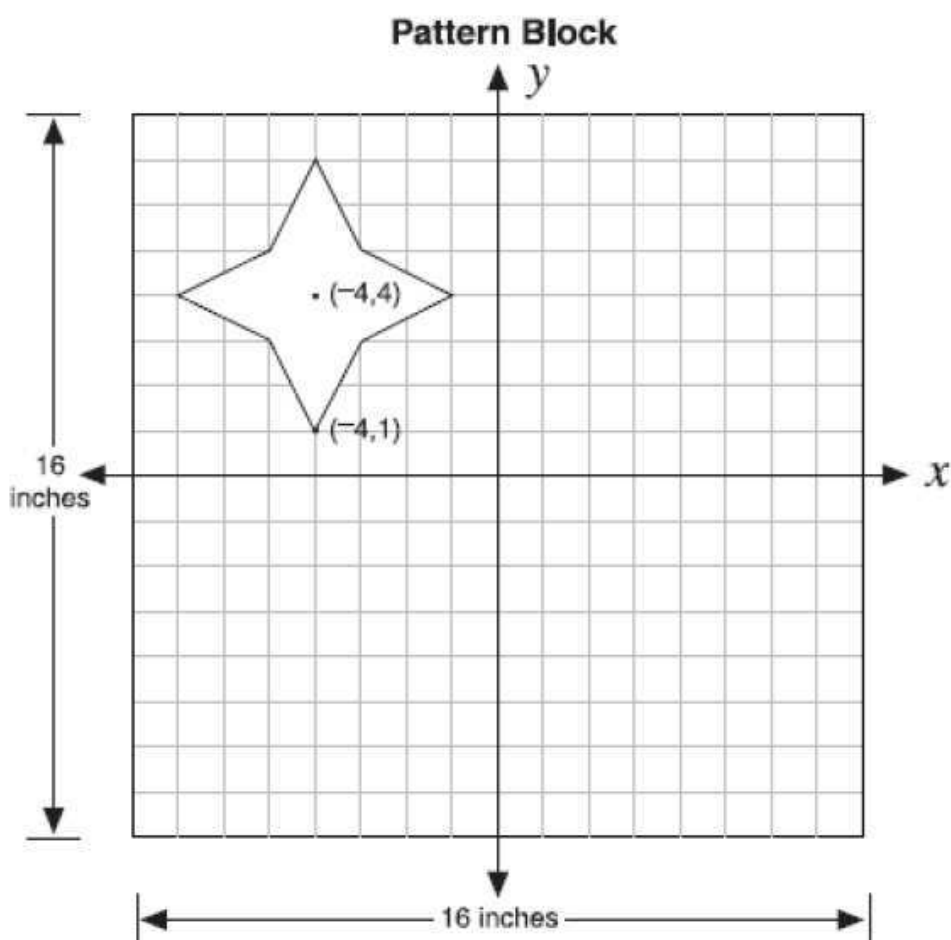
Expected Performance 3.3a(1)

## Emily's Quilt - OE



Emily is planning a design for a quilt that uses a quilting block that contains 4 tetragrams (4-pointed stars) like the one shown above. The tetragram in the design has four-fold symmetry (contains 4 lines of symmetry). She began drawing the design for the pattern with one of the tetragrams centered at point  $(-4, 4)$  on the grid shown in your answer booklet.

- On the grid in your answer booklet, draw one tetragram that is a reflection of the original across the  $y$ -axis.
- Determine the area, in square inches, of one of the four tetragrams on the quilt block. Show your work or explain how you got your answer.



## Measurement & Geometry

Expected Performance 3.3a(1)

### City Construction – GI

Use your inch ruler to help you answer this question.



Scale: 1 inch represents 120 feet

The scale drawing shows the city block in Hartford where new construction is taking place. What is the area of the city block in SQUARE FEET?

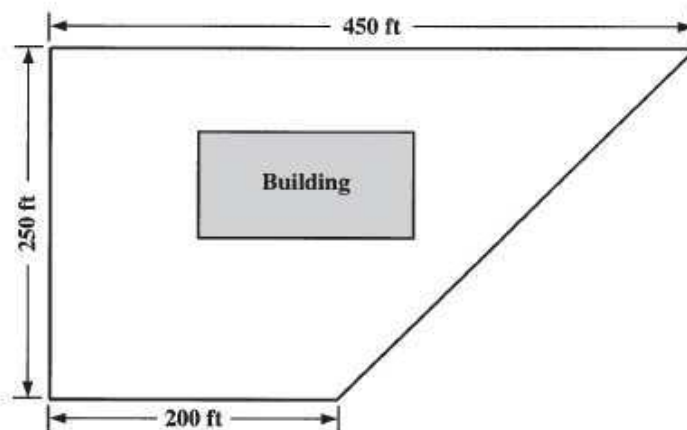
[2001 Released Item](#)

### Paving with Asphalt – OE

Use your ruler to help you answer this question.

An asphalt company plans to pave a parking lot that is in the shape of a trapezoid, as shown in the scale drawing in your answer booklet. The parking lot surrounds a building.

Estimate the area that the company plans to pave. Show your work or explain how you found your estimate.



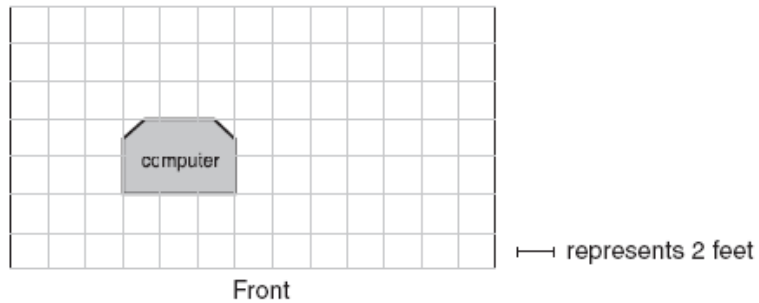
[2005 Released Item](#)

# Measurement & Geometry

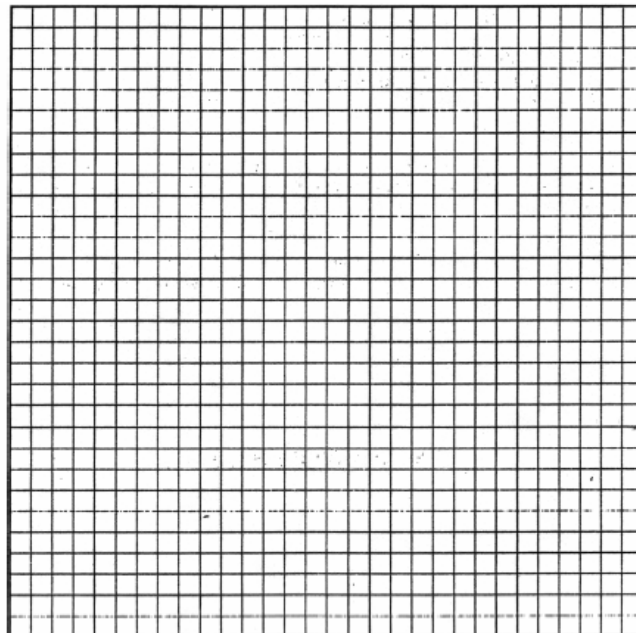
Expected Performance 3.2a(3)

## Computer Lab – OE

You are in charge of moving one of the computers in a computer lab. The diagram below shows the current position of the computer.



- Your instructions indicate that you are to first rotate the computer  $90^\circ$  counterclockwise about its center. On the grid provided in your answer booklet, sketch the computer in its rotated position.
- Then you are to translate (slide) it 6 feet to the right. On the grid provided in your answer booklet, sketch the computer in its final position.



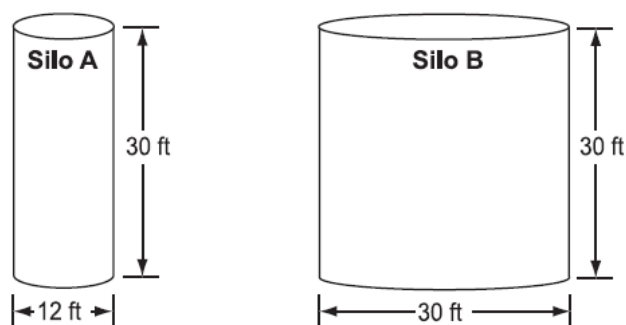
## Hugo's Pizza – GI

Hugo ordered two circular pizzas, each with a diameter of 10 inches. Greg ordered one circular pizza with an area equal to the sum of the areas of Hugo's two pizzas. What was the **diameter** of Greg's pizza? (Use 3.14 for  $\pi$  and round your answer to the nearest hundredth of an inch.)

[2002 Released Item](#)

## Two Silos – OE

A farmer has two grain silos, both shaped like right circular cylinders, with dimensions shown in the diagrams below.



- How much greater is the volume of Silo B than the volume of Silo A? Show your work or explain how you found your answer.
- The farmer has the same amount of grain stored in each of the two silos. Silo A is filled to the top. What is the height, in feet, of the level of the grain in Silo B? Show your work or explain how you found your answer.

[2007 Released Item](#)

## Measurement & Geometry

Expected Performance 3.2a(3)

## Tile Company – GI

- Marisa works as an installer for the tile company. Marisa is installing a tile that is shaped like a regular octagon. She placed a tile into position A for a customer to see.



The customer is not satisfied with the appearance of the tile, and has asked Marisa to rotate the tile into position B. Through how many degrees must Marisa rotate the tile in a clockwise direction to change it from position A to position B?

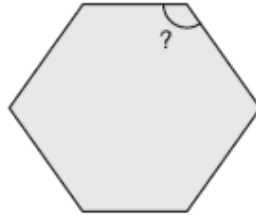
[2004 Released Item](#)

## Measurement & Geometry

Expected Performance 3.2a(1)

### Tile Company – GI

10. The tile company manufactures kitchen tiles in the shape of regular hexagons, as shown below.



What is the degree measure of each interior angle of one of these tiles?

[2004 Released Item](#)

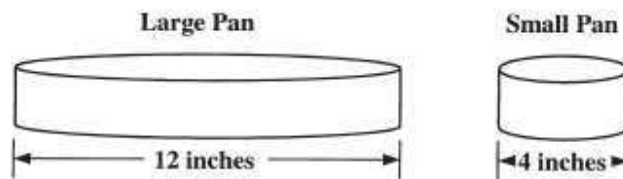
## Measurement & Geometry

Expected Performance 3.2a(2)

### Cheesecake Pans – OE

Mrs. Olivares' consumer science class is making two different-size cheesecakes for a fundraiser.

- the large cheesecake pan has a diameter of 12 inches
- the small cheesecake pan has a diameter of 4 inches



- If the pans are both 3 inches deep, how many times greater is the volume of the large pan than that of the small pan? Use 3.14 for  $\pi$ . Show your work or explain how you found your answer.
- When shipped, the cheesecakes will be covered on the top, bottom and sides with wax paper. What is the minimum amount of wax paper needed to completely cover a cheesecake that has the same volume as the large pan? Show your work or explain how you found your answer.

[2005 Released Item](#)

## Measurement & Geometry

Expected Performance 3.1a(3)

### Entertainment Center – GI

José wants to buy a new TV that will fit the opening of his entertainment center. The height of the opening in his entertainment center is 27 inches. Usually, the opening of an entertainment center has a width-to-height ratio of 4:3.

What is the diagonal measurement of the opening in José's entertainment center?

[2007 Released Item](#)

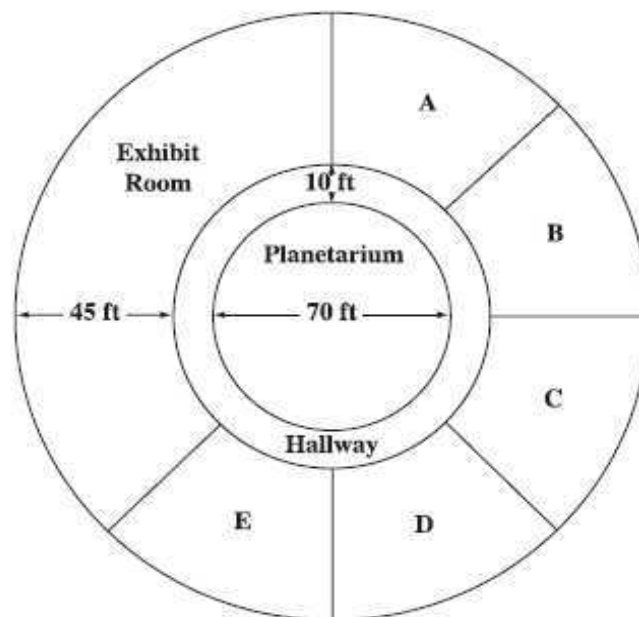
## Measurement & Geometry

Expected Performance 3.1b(2)

### Planetarium – OE

The floor plan for a new building that will house a planetarium is shown in your answer booklet. The Side Rooms, A, B, C, D, and E, are all the same size, and the Exhibit Room is three times as large as a Side Room.

- What is the total area, in square feet, of the floor plan? Use 3.14 for  $\pi$ . Show your work or explain how you found your answer.
- The director of the building would like to have 6,000 square feet available for opening day ceremonies. Would the Exhibit Room have enough square footage for the director's needs? Use 3.14 for  $\pi$ . Show your work or explain how you found your answer.



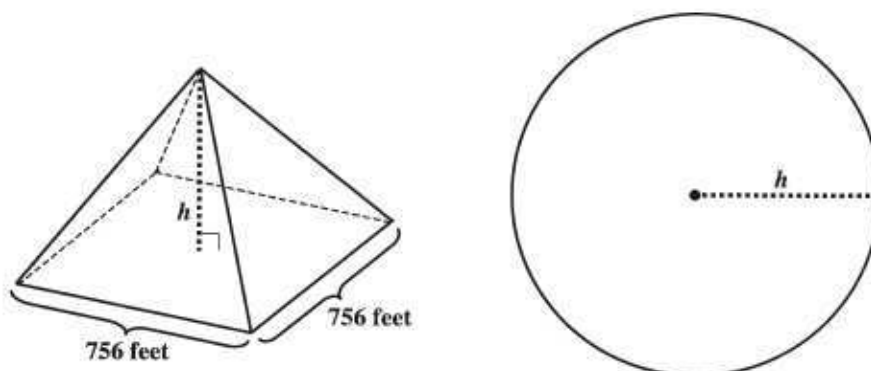
[2005 Released Item](#)

## Measurement & Geometry

Expected Performance 3.1a(2)

### Great Pyramid - GI

The Great Pyramid at Giza is the only one of the famous "Seven Wonders of the Ancient World" that still exists today.



15. The base of the Great Pyramid is a square with each side 756 feet in length. Suppose a circle, as shown above, has a circumference equal to the perimeter of the base of the Great Pyramid. The height,  $h$ , of the Great Pyramid has the same measurement as the radius of this circle. What is the height, in feet, of the Great Pyramid? Use 3.14 for  $\pi$  and round your answer to the nearest whole foot.

[2005 Released Item](#)

### Paper Range – GI

A discount store has a square floor with an area of 14,400 square meters. To test the range of its silent pager system, two employees stood in opposite corners of the floor, and one paged the other. To the nearest meter, what was the diagonal distance between the two employees?



[2002 Released Item](#)