Missouri Assessment Program
Spring 2006

Mathematics

Released Items

Grade 10

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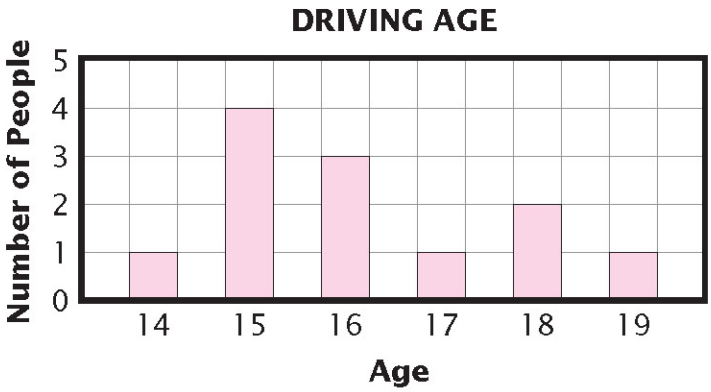
2 Lita flipped a coin 5 times. On each flip the coin landed on tails. Which of these shows how to calculate the probability of this outcome?

- ○ $5 \times \frac{1}{2}$
- ○ $\frac{1}{2} \times \frac{1}{5}$
- ○ $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$
- ○ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$

3 The graph below shows the ages at which 12 people learned to drive.



Which of these best describes the distribution?

- ○ symmetric
- ○ skew
- ○ u-shaped
- ○ bell-shaped

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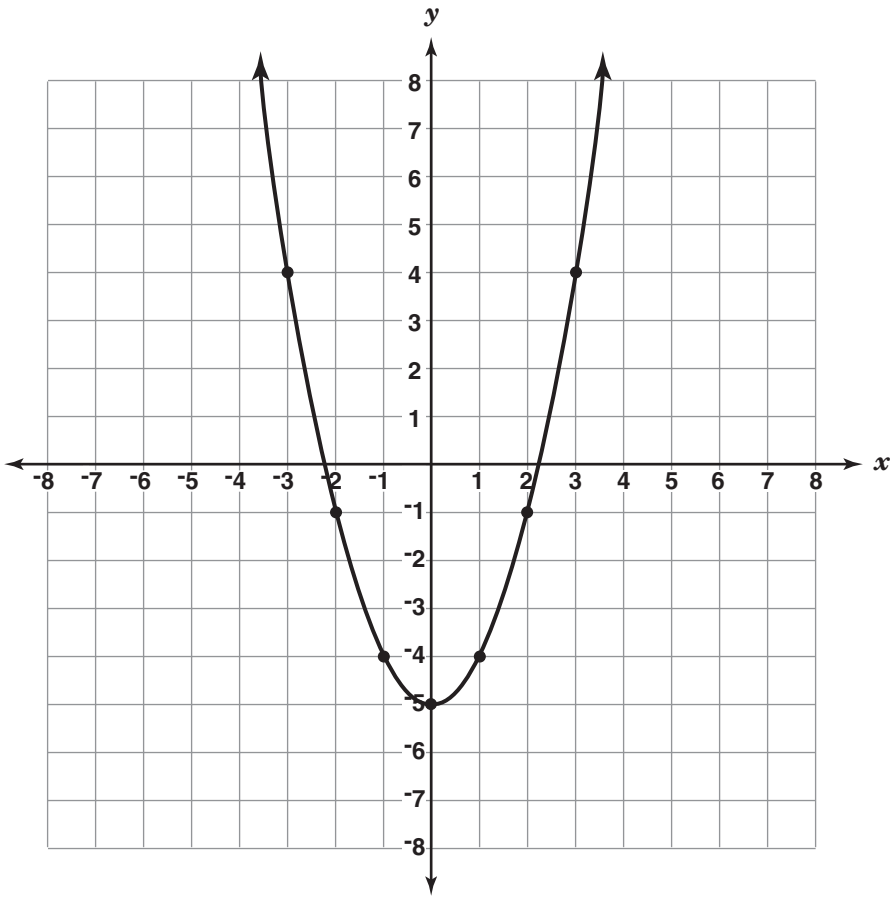
4 Study the graph on the grid below.



When the graph is reflected across the *x*-axis, what are the coordinates of the vertex?

- ○ (⁻5, 0)
- ○ (0, ⁻5)
- ○ (0, 5)
- ○ (5, 0)

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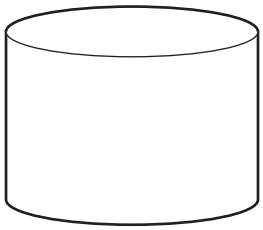
5 Study the diagram below of a cylindrical swimming pool.



Sara measured the dimensions of the pool. The table below shows Sara's measurements and the actual dimensions of the pool.

POOL DIMENSIONS

	Sara's Measurement (in inches)	Actual Size (in inches)
Height	48	48
Diameter	70	72

How much less will Sara's volume calculation be than the actual volume? In the space below, provide the work that shows how you arrived at your answer and write your answer on the line. Use 3.14 for π.

_____ cubic inches

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6 Tickets for a school concert cost $2 for students and $5 for adults. A total of 200 tickets were sold for $670. How many of the tickets were sold to students?

- ○ 335
- ○ 110
- ○ 100
- ○ 90

8

Tyrone has a cylindrical fish tank. The tank is 50 centimeters high and has a radius of 10 centimeters. What is the approximate volume of the tank?

- ○ 60 cubic centimeters
- ○ 500 cubic centimeters
- ○ 3,140 cubic centimeters
- ○ 15,700 cubic centimeters

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10 Dan is playing a computer game. The object of the game is to determine the rule the computer is using to change the input number. The table below shows the input number and the output number.

FIND THE RULE

Input Number	0	1	2	3	4	5
Output Number	1	2	5	10	17	26

On the line below, write a rule that shows the relationship between the output number and the input number.

_____

What is the output number when the input number is 12? Write your answer on the line below.

_____

11 Alison's desk drawer contains 4 blue pens and 5 black pens. Alison selects a blue pen from the drawer and does not put it back. Without looking, Alison selects a second pen from the drawer. What is the probability that the second pen she selects is blue?

○ $\frac{3}{5}$

○ $\frac{3}{8}$

○ $\frac{1}{3}$

○ $\frac{1}{5}$

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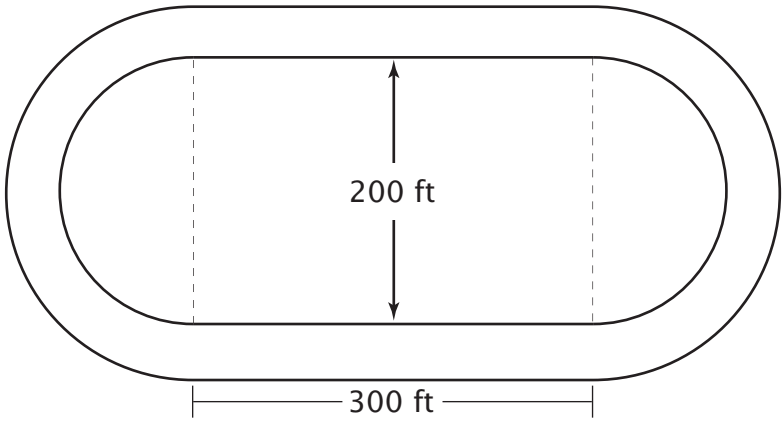
12 Study the diagram of a track shown below.



[Not drawn to scale]

The area of the field inside the track can be divided into 2 semicircles and a rectangle. Mandy ran once around the track. Approximately how far did Mandy run?

- ○ 930 feet
- ○ 1,000 feet
- ○ 1,230 feet
- ○ 1,860 feet

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13 Study the pattern below.

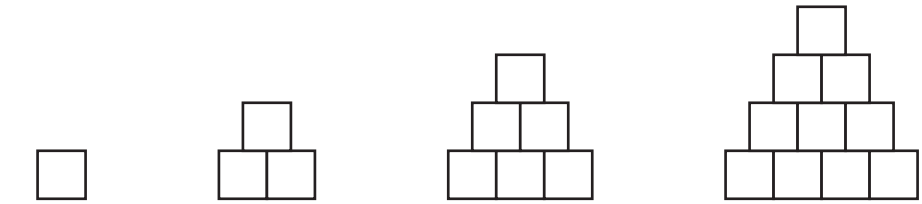

Figure 1 Figure 2 Figure 3 Figure 4

Continue the pattern. What is the total number of squares that will be in Figure 10?

- ○ 25
- ○ 45
- ○ 55
- ○ 66

14 The table below shows the distances needed to stop a car traveling at various speeds.

DISTANCES INVOLVED IN STOPPING A CAR

Speed (in miles per hour)	Reaction Distance (in feet)	Braking Distance (in feet)	Total Stopping Distance (in feet)
10	22	5	27
20	44	20	64
30	66	45	111
40	88	80	168
50	110	125	235

Based on the data given, what would be the total stopping distance for a car that is traveling 60 miles per hour?

257 feet ○ 290 feet ○ 302 feet ○ 312 feet ○

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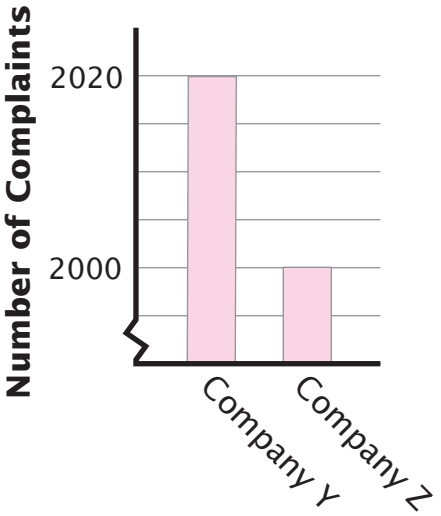
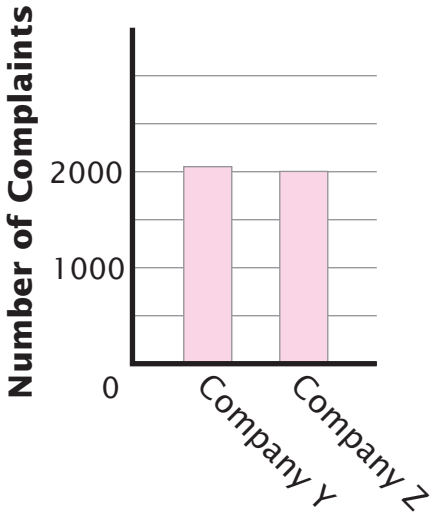
15 The graphs below show that during the same year, Company Y received 2,020 complaints and Company Z received 2,000 complaints.



Graph A



Graph B

On the lines below, explain how Graph A misrepresents the data in favor of Company Z.

On the lines below, explain how Graph B more accurately shows the comparison between the number of complaints received by the two companies.

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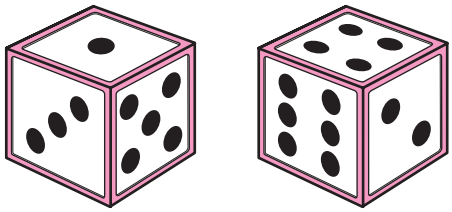
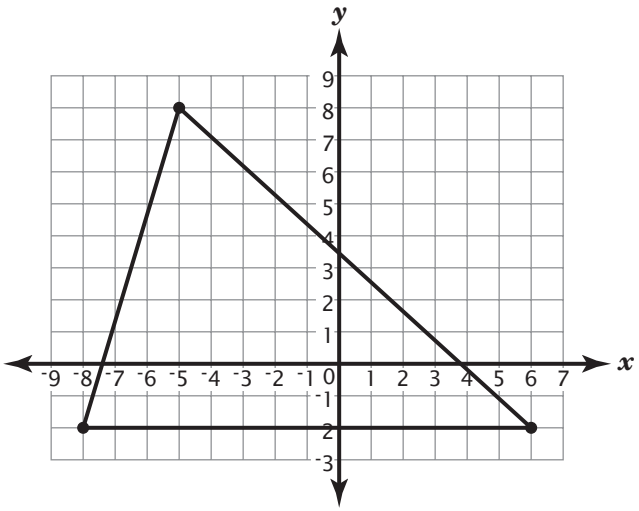
16 Each face on a number cube is identified by a number from 1 to 6. Vanessa is rolling two number cubes and adding the numbers on the top faces. What sum is Vanessa most likely to roll?

- ○ 5
- ○ 6
- ○ 7
- ○ 8



17 Study the triangle on the grid below.



What is the area of the triangle?

- ○ 35 square units
- ○ 68 square units
- ○ 70 square units
- ○ 140 square units

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18 Carla wants to determine the mean number of hours a student in her class spends on homework per week. Carla surveyed 8 students in her classroom. The results of Carla's survey are shown below.

TIME SPENT ON HOMEWORK

Student	A	B	C	D	E	F	G	H
Time Spent on Homework (in hours)	3	8	4	9	10	13	10	2

Using this data, Carla estimated the mean number of hours per week that a student in her class spends on homework. Which of these is closest to Carla's mean?

- ○ 3 hours per week
- ○ 7 hours per week
- ○ 9 hours per week
- ○ 10 hours per week

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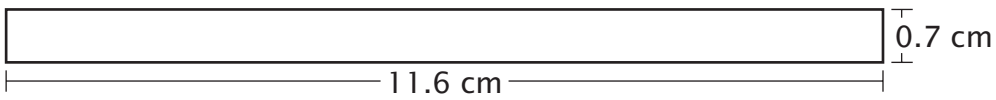
20 The length of each side of a rectangle is doubled. How many times larger will the area of the new rectangle be? In the space below, provide the work that shows how you arrived at your answer and write your answer on the line.

_____ times larger

21 Study the rectangle below.



Tom estimated the area of the rectangle as 12 cm^2. How much does his estimate differ from the actual area of the rectangle?

- ○ 3.74 cm^2
- ○ 3.82 cm^2
- ○ 3.88 cm^2
- ○ 4.88 cm^2

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23 The height of a ball thrown into the air is given by the equation shown below.

$y = 48x - 16x^2$
x = time, in seconds y = height of ball, in feet

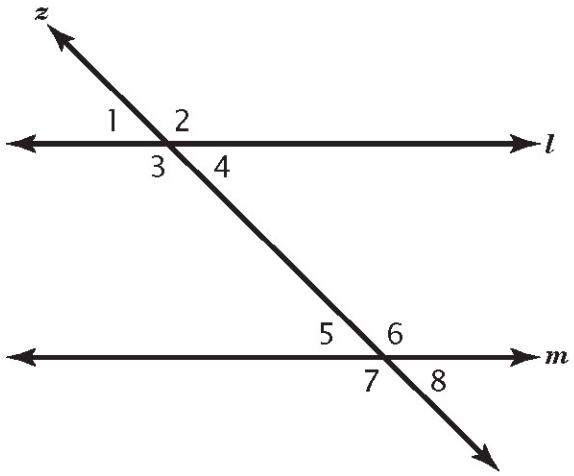
What is the height of the ball after 2 seconds?

- ○ 30 feet
- ○ 32 feet
- ○ 64 feet
- ○ 128 feet

24 Which of these is equivalent to $3(x + 4)^2$?

- ○ $3x^2 + 48$
- ○ $3x^2 + 12x + 48$
- ○ $3x^2 + 24x + 24$
- ○ $3x^2 + 24x + 48$

25 Study the figure below.



Lines l and m are parallel, and line z is not perpendicular to line l or line m. Which two angles have measures that add up to 180° ?

- ○ 1 and 8
- ○ 3 and 6
- ○ 4 and 7
- ○ 6 and 7

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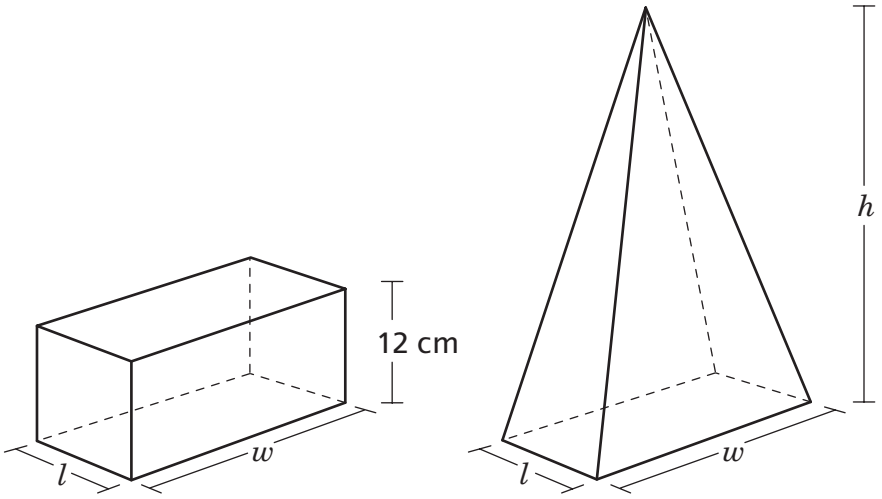
26 The diagrams below show a rectangular ***prism*** and a rectangular ***pyramid***. The two solids have congruent bases.



[Not drawn to scale]

The volumes of the rectangular prism and the rectangular pyramid are equal. What is the height (h) of the rectangular pyramid? In the space below, provide the work that shows how you arrived at your answer and write your answer on the line.

_____ centimeters

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27 Lauren, Kathy, and Nicole earn the same base pay of $25,000, and the same rate of commission (percentage of total sales). The table below shows their annual sales and salaries.

SALES AND SALARY INFORMATION

Salesperson	Annual Sales (in dollars)	Annual Salary (in dollars)
Lauren	500,000	75,000
Kathy	700,000	95,000
Nicole	350,000	60,000

Which equation can be used to find the total annual salary for each salesperson?

KEY
x = Annual Sales y = Annual Salary

- ○ $y = 25{,}000 + \frac{1}{10}x$
- ○ $y = 25{,}000 + 10x$
- ○ $y = 25{,}000x + \frac{1}{10}$
- ○ $y = 25{,}000x + 10$

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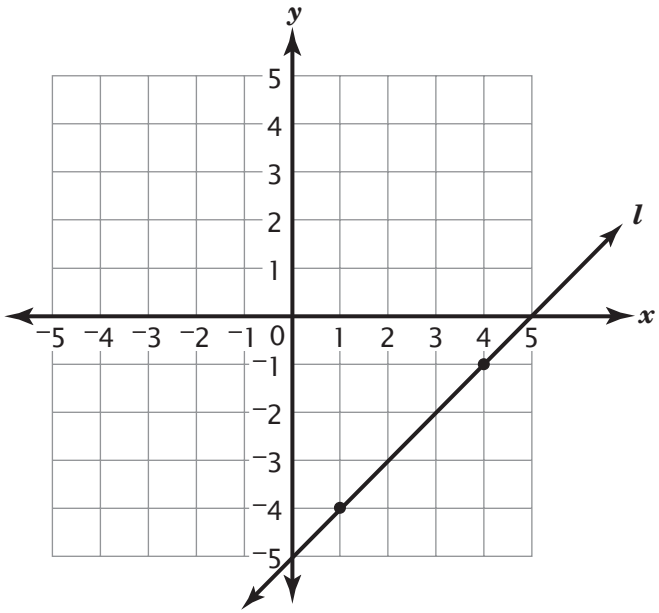
28 Study the graph on the grid below.



What is the equation of line l on the graph?

- ○ $y = {}^{-}x + 5$
- ○ $y = x - 5$
- ○ $y = x + 5$
- ○ $y = {}^{-}x - 5$

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29 What is the range (all possible y-values) of the function $y = x^2 - 9$ if x is any real number?

- ○ all real numbers except 3
- ○ all real numbers except $^-3$
- ○ all real numbers greater than or equal to 9
- ○ all real numbers greater than or equal to $^-9$

30 One of your friends wants to add a high-energy, powdered orange-drink mix to the water in a canteen that holds 8 cups. The package directions call for 3 tablespoons of mix to one quart of water. About how many tablespoons of mix should be added to a full canteen of water? In the space below, provide the work that shows how you arrived at your answer and write your answer on the line.

_____ tablespoons

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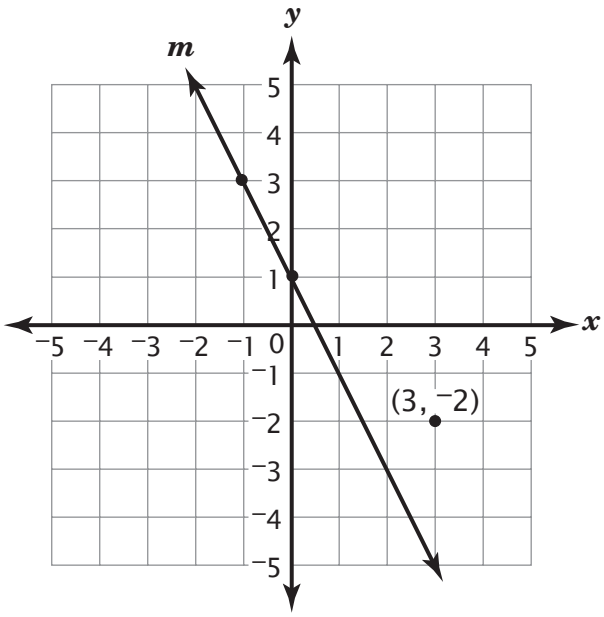
31 Study the grid below.



What is the equation of the line that passes through (3, $^{-}$2) and is ***parallel*** to line *m*?

- ○ $y = {}^{-}2x - 8$
- ○ $y = {}^{-}2x + 4$
- ○ $y = 2x - 8$
- ○ $y = 2x + 4$

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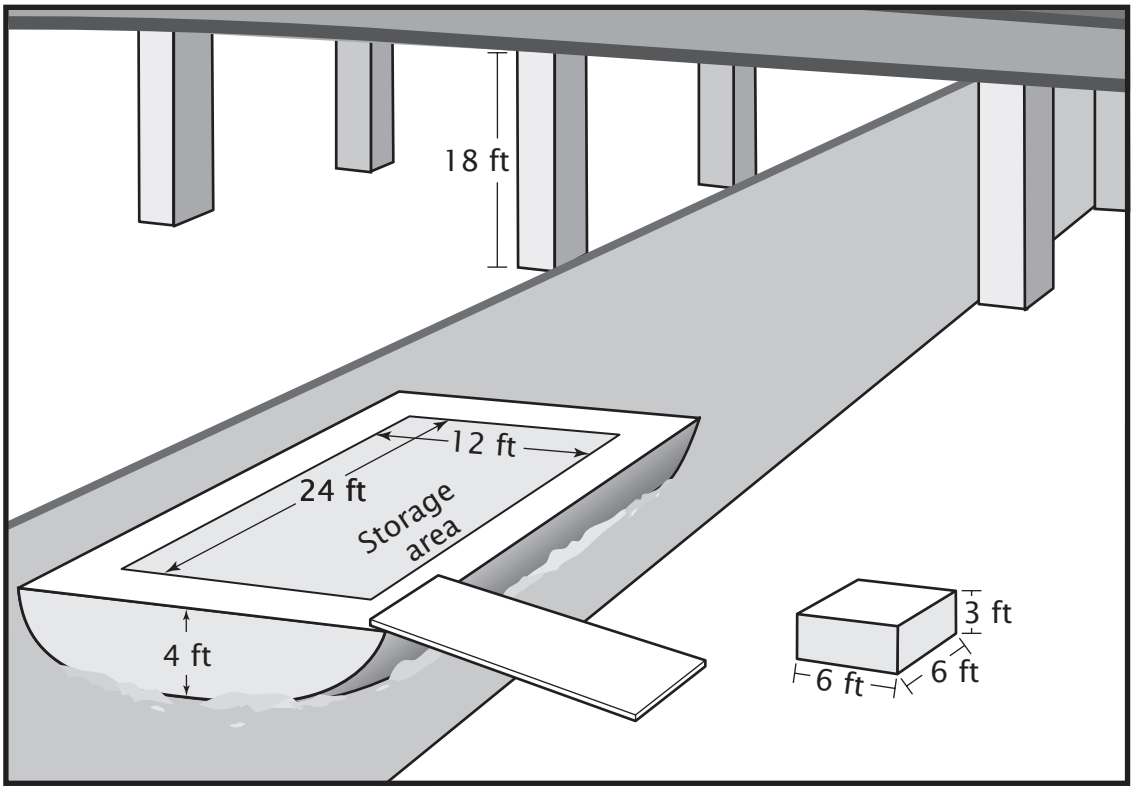
32 The picture below shows a barge that will carry containers of cargo.



[Not drawn to scale]

Part A

- Before any containers are loaded onto the barge, the deck of the barge is 4 feet above the surface of the water.
- The barge lowers 1.25 inches into the water for each container placed on the barge.
- The deck of the barge must stay above the surface of the water.

What is the maximum number of containers that can be placed on the barge? In the space below, provide the work that shows how you arrived at your answer and write your answer on the line.

_____ containers

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Part B

- The storage area of the barge is rectangular and measures 12 feet by 24 feet.
- The bottom of the bridge is 18 feet above the surface of the water.
- Each container is shaped like a rectangular prism with dimensions 3 feet by 6 feet by 6 feet.
- A container can be placed on any one of its sides.
- Containers can be stacked on top of each other.

Using your work from Part A and the information above, design an arrangement of the containers on the barge. Justify that your arrangement of containers will allow the barge to pass under the bridge. In the space below, draw or describe your arrangement of the containers on the barge.

STOP

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