

The Spring 2006 6th Grade MCAS exam has 39 questions, 5 of which are open response worth 4 points each. Each of the 34 multiple choice questions are worth 1 point each for a total test score of 54.

**Question 10:** Number Sense and Operations

A local bakery celebrated its one-year anniversary on Saturday. On that day, every 4th customer received a free cookie. Every 6th customer received a free muffin.

- Did the 30th customer receive a free cookie, a free muffin, both, or neither? Show or explain how you got your answer.
- Casey was the first customer to receive both a free cookie and a free muffin. What number customer was Casey? Show or explain how you got your answer.
- Tom entered the bakery after Casey. He received a free cookie only. What number customer could Tom have been? Show or explain how you got your answer.
- On that day, the bakery gave away a total of 29 free cookies. What was the total number of free muffins the bakery gave away on that day? Show or explain how you got your answer.

Ⓐ The 30th customer will receive a muffin. I know this because 30 can't be divided by 4 (so no cookie) however it can be divided by 6. The customer will receive 1 muffin.

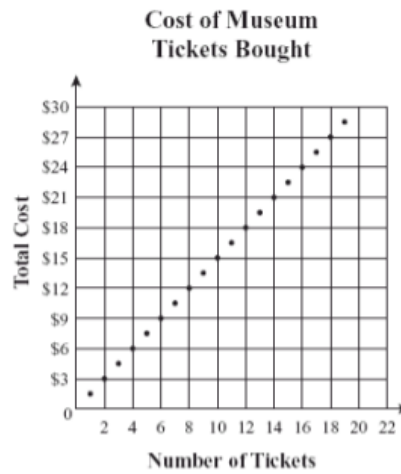
Ⓑ Casey must have been customer number 12. I know this is true because it is the first number that can be divided by both 6 and 4.

Ⓒ Tom could have been customer 16. I know this because it's the first number after 12 that can be divided by only 4.

Ⓓ There were 19 muffins given away. I found my answer by first doing  $29 \times 4$ . I got 116. Then I did 116 divided by 6 because every 6th customer got a muffin.  $116 \div 6 = 19.\bar{3}$ . That's about 19. So 19 muffins were given away that day.

**Question 13:** Patterns, Relations, and Algebra

The graph below shows the relationship between the number of museum tickets bought and the total cost of the tickets.



- What is the greatest number of museum tickets that can be bought for \$21?
- What is the cost of 1 museum ticket? Show or explain how you got your answer.
- Using numbers, words, or symbols, write a rule that could be used to find the total cost of any number of museum tickets. You may use  $n$  to represent the number of museum tickets bought.
- Calvin bought a one-year museum pass for \$45. The pass allows him to visit the museum an unlimited number of time during one year. What is the least number of times Calvin must visit the museum, during one year, in order for his one-year pass to be less expensive than buying a single museum ticket for each visit? Show or explain how you got your answer.

A.) 14 tickets.

B.) 2 tickets = \$3.00       $\frac{1}{2}$  of 2 is 1 and  
 $\frac{1}{2}$  of \$3.00 = \$1.50      Answer for SCore Point 4      tickets costs \$1.50

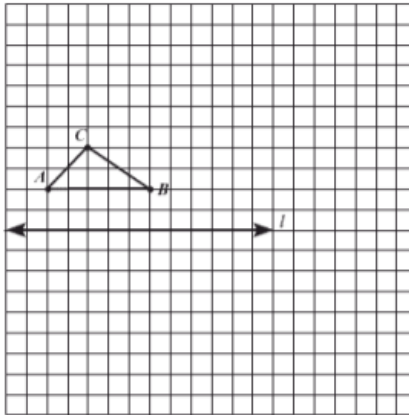
C.) Number of museum tickets  $\times$  \$1.50 = cost

D.) The pass cost was \$45, it costs \$30 to go 20 times, it also costs \$15 to go 10 times. If you add the costs of both \$30 + \$15 = \$45 and the

times you went  
 $20 + 10 = 30$  time he has  
to go 31 times for  
his pass to be a  
better deal.

**Question 17:** Geometry

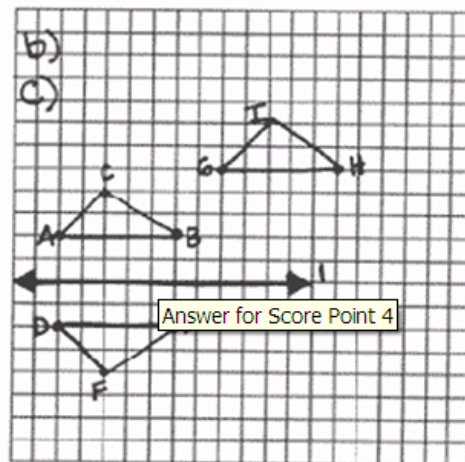
Copy triangle  $ABC$  and line  $l$ , shown below, onto the grid in your Student Answer Booklet. Be sure to label points  $A$ ,  $B$ , and  $C$  in your drawing.



- Is triangle  $ABC$  equilateral, isosceles, or scalene? Explain your reasoning.
- On the grid in your Student Answer Booklet, draw the reflection of triangle  $ABC$  over line  $l$ . Label the new triangle  $DEF$ .
- On the grid in your Student Answer Booklet, draw the translation of triangle  $ABC$  after it has been moved 7 units right and 3 units up. Label the new triangle  $GHI$ .
- Are triangle  $DEF$  and triangle  $GHI$  congruent? Explain your reasoning.

a) Triangle A, B, C is scalene. I know this because all the sides are different lengths.

d) Triangle D, E, F and triangle G, H, I are congruent. I know this because they are the same shape, and size.

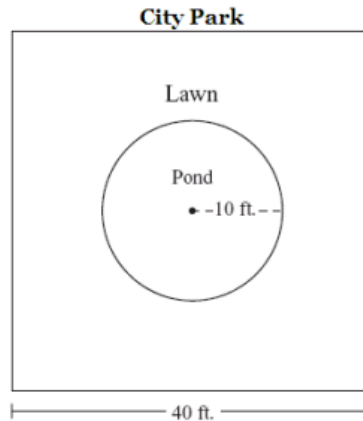


**Question 27:** Measurement

A city park is in the shape of a square, with each side measuring 40 feet.

- a. What is the area, in square feet, of the city park? Show or explain how you got your answer.

The city has decided to put a pond in the shape of a circle in the center of the park. The circle will have a radius of 10 feet, as shown in the diagram below. The remaining portion of the park will be a lawn.



- b. What is the approximate area, in square feet, of the circle? Show your work. (Use 3.14 for  $\pi$ .)
- c. A landscaper plans to fertilize the lawn of the park. What is the approximate area, in square feet, of the lawn of the park? Show or explain how you got your answer.
- d. One bag of GrowFast fertilizer can fertilize 50 square feet. How many bags of GrowFast will the landscaper need in order to fertilize the lawn of the park? Show or explain how you got your answer.

a. 
$$\begin{array}{r} 40 \\ \times 40 \\ \hline 1600 \text{ ft}^2 \end{array}$$

b. 
$$\begin{aligned} A &= \pi r^2 \\ A &= 3.14 \times 10^2 \\ A &= 3.14 \times 100 \\ A &= 314 \text{ ft}^2 \end{aligned}$$

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 3.14 \\ \times 100 \\ \hline 314.00 \end{array}$$

c. 
$$\begin{array}{r} 59, \\ 1600 \\ - 314 \\ \hline 1286 \text{ ft}^2 \end{array}$$

d. 
$$\begin{array}{r} 25.72 \rightarrow 26 \text{ bags} \\ 50 \overline{) 1286.00} \\ \underline{1000} \phantom{00} \\ 286 \phantom{00} \\ \underline{250} \phantom{00} \\ 360 \phantom{00} \\ \underline{350} \phantom{00} \\ 100 \end{array}$$

**Question 31:** Data Analysis, Statistics, and Probability

Katie will take a total of 5 mathematics tests. She has taken 4 mathematics tests so far. The scores on her first 4 tests are shown in the table below.

**Katie's Mathematics Test Scores**

Test	Score
1	94
2	98
3	86
4	92
5	?

- What is the median of Katie's first 4 mathematics test scores? Show or explain how you got your answer.
- What is the mean of Katie's first 4 mathematics test scores? Show or explain how you got your answer.
- What score must Katie get on her 5th test in order to have a mean score of 90 on all 5 of her mathematics tests? Show or explain how you got your answer.

a.  $94, 92, 94, 98$   
 $(93)$

The median of the first 4 math tests is  $(93)$  because that is the middle number.

b. 
$$\begin{array}{r} 294 \\ 92 \\ + 98 \\ \hline 370 \end{array}$$
$$\begin{array}{r} 92.5 \\ 4 \overline{)370} \\ \underline{-36} \\ 10 \\ \underline{-8} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

The mean score of the first four tests is  $(92.5)$  because if you add up the numbers and divide the sum by four, you get your average.

Answer for SCore Point 4

c. 
$$\begin{array}{r} 90 \\ \times 5 \\ \hline 450 \end{array}$$
$$\begin{array}{r} 3450 \\ -370 \\ \hline 80 \end{array}$$

Katie would have to get a score of  $(80)$ . First, I multiplied 90 by 5 to get the sum of all the numbers. Then, I subtracted the sum from letter B from the product in letter C. The difference I got was 80 so the answer is  $(80)$ .