

Student Name:

School Name:

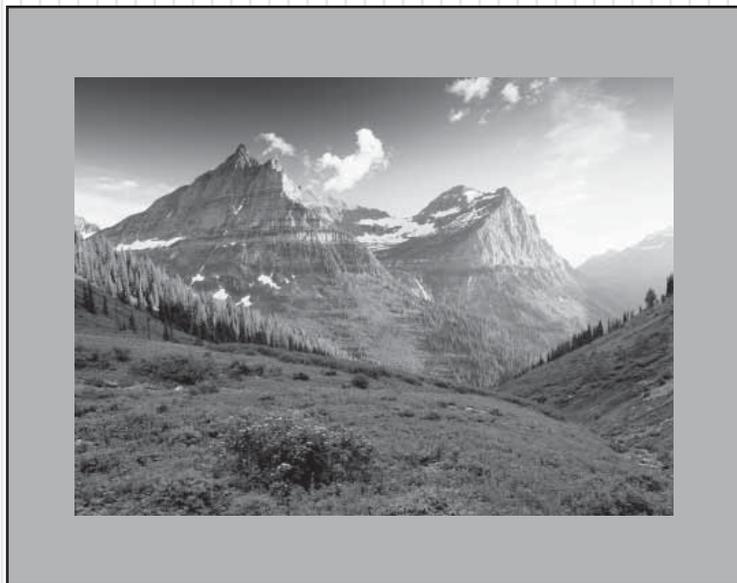
Teacher/Class:

**Montana**  
**Comprehensive Assessment**  
**System** (*MontCAS, Phase 2 CRT*)

GRADE 7

FORM 1

SPRING 2006



**OPI**

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# Mathematics

## Session 1 (Calculator)

This test session includes multiple-choice questions and a question for which you must show your work or write out your answer. You may use a calculator during this session.

Mark your answers to questions 1 through 24 in the section marked “Mathematics—Session 1 (Calculator)” in your Student Response Booklet.

1. Candice made the chart below to show her parents how she plans to save for a new skateboard that costs \$110.

Month	Balance
Now	\$ 38.00
1	\$ 46.00
2	\$ 54.00
3	\$ 62.00
4	\$ 70.00
5	\$ 78.00
6	\$ 86.00
7	\$ 94.00
8	\$102.00
9	\$110.00

How can Candice explain her plan in words?

- A. “I have \$38 and plan to save \$7 each month.”
- B. “I have \$38 and plan to save \$8 each month.”
- C. “I have \$38 and plan to save \$10 each month.”
- D. “I have \$38 and plan to save \$12 each month.”

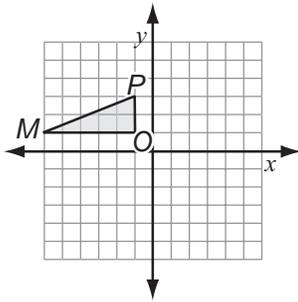
2. For his first four games, Allen had an average score of 131. For his fifth game, he had a score of 141. What was his average score for the five games?
- A. 133
- B. 134
- C. 135
- D. 136
3. Ben must guess the number of gum balls in the jar shown below.



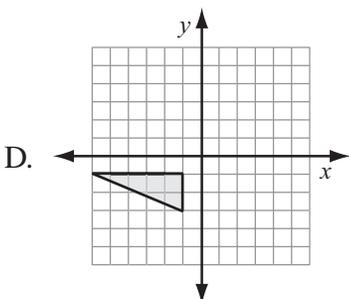
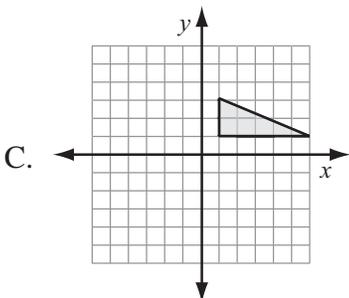
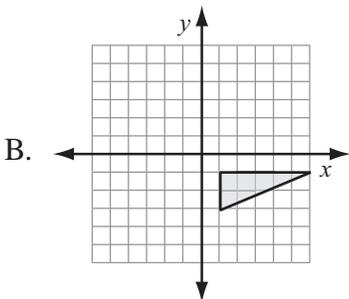
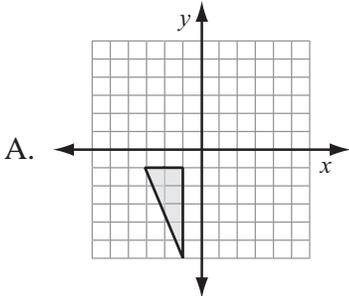
- Ben estimates that the jar has a diameter of 6 gum balls and a height of 9 gum balls. Based on Ben’s estimates, about how many gum balls are in the jar?
- A. 50 gumballs
- B. 150 gumballs
- C. 250 gumballs
- D. 1000 gumballs



Use the graph below to answer question 4.



4. Which graph shows the image of triangle *MOP* after it is reflected across the *x*-axis?



5. The speed limit has increased on the highway to Jill's grandmother's house. It used to take Jill  $3\frac{1}{2}$  hours to get there driving at an average speed of 60 miles per hour. How much **less** time will it take Jill to get to her grandmother's house driving at an average speed of 70 miles per hour?

- A. 10 minutes less
- B. 20 minutes less
- C. 30 minutes less
- D. 35 minutes less

6. Scientists use this formula to convert Fahrenheit, *F*, to Celsius, *C*.

$$C = \frac{5}{9}(F - 32)$$

To the nearest degree, how many degrees Celsius is  $132^{\circ}\text{F}$ ?

- A.  $56^{\circ}\text{C}$
- B.  $91^{\circ}\text{C}$
- C.  $180^{\circ}\text{C}$
- D.  $295^{\circ}\text{C}$

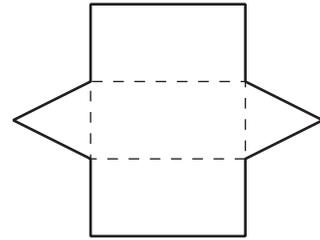


7. A chef bought a circular cardboard cake round to go under the bottom layer of a wedding cake. The cake round has a diameter of 16 inches. He wants to wrap a ribbon around the edge of the cake round to cover up the cardboard. About how much ribbon does he need?
- A. 25 inches
  - B. 50 inches
  - C. 200 inches
  - D. 800 inches

8. Annie is sending a 25-pound package to France. Which amount is closest to the mass of the package in kilograms?
- A. 0.1 kilogram
  - B. 1 kilogram
  - C. 10 kilograms
  - D. 100 kilograms

9. The monthly bill for Josie's cell phone is \$45.00 plus \$0.15 for each minute used over 200 minutes. One month, she used her phone for 500 minutes. What was her bill that month?
- A. \$45.00
  - B. \$45.45
  - C. \$49.50
  - D. \$90.00

10. The pattern shown below can be folded along the dotted lines to form a three-dimensional shape.



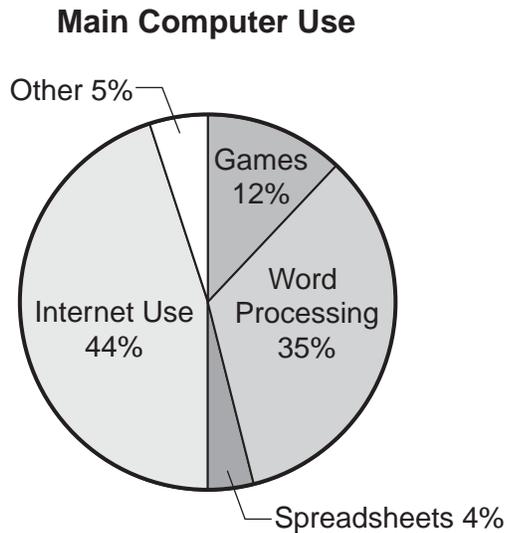
Which shape will result from the pattern being folded?

- A.
- B.
- C.
- D.

11. A group of volunteers is packing 60 bags of groceries for the victims of a flood. Each bag will be packed with 12 cans and 6 packages of food. Which expression shows the total number of items that will be packed by the volunteers?
- A.  $60(12+6)$
  - B.  $60+12+6$
  - C.  $60 \times 12 \times 6$
  - D.  $12+6 \times 60$

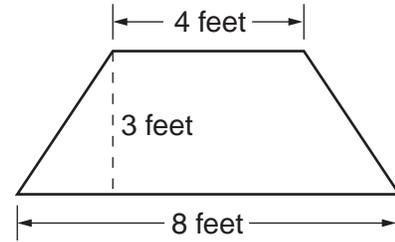


12. A computer company surveyed customers about the main use of their computer. The results are shown below.



The computer company surveyed 200 customers. How many customers said that their main use of the computer is to make spreadsheets?

13. Steve has been hired to lay tile in an entryway with the dimensions shown below.



What is the area of the entryway?

- A. 14 square feet
  - B. 16 square feet
  - C. 18 square feet
  - D. 36 square feet
14. The 7th-grade representatives at a school are going to take a survey to decide whether to have a dance or an activity night. Which sample group will **best** represent the 7th-grade students at the school?
- A. a random sample of 100 7th-grade students as they arrive for school
  - B. a random sample of 100 7th-grade students attending the football game
  - C. fifteen friends of each 7th-grade representative
  - D. the first 100 7th-grade students that sign up to complete the survey



15. Members of the band are selling candy bars to raise money. The director uses this equation to calculate the amount of profit,  $p$ , made from selling  $n$  candy bars.

$$p = 1.50n - 500$$

How many candy bars must be sold to make a profit of \$700?

- A. 134  
 B. 300  
 C. 800  
 D. 967
16. Myra's dad is making her a rocking chair similar to the miniature chair shown below.



**Regular Size Chair**



**Miniature Chair**

**Not to Scale**

The miniature chair is  $\frac{1}{2}$  inch wide and  $1\frac{1}{2}$  inches tall. If Myra's chair is 18 inches wide, how tall will it be?

- A. 1.5 feet  
 B. 4.5 feet  
 C. 18 feet  
 D. 54 feet

17. Maurice is roasting a turkey for dinner. The chart below is on the turkey package.

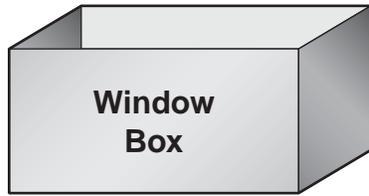
Weight of Turkey	Time to Cook
10 pounds	2 hours 30 minutes
12 pounds	3 hours
14 pounds	3 hours 30 minutes
16 pounds	4 hours

How long will it take Maurice to roast a 25-pound turkey?

- A. 5 hours 15 minutes  
 B. 5 hours 30 minutes  
 C. 6 hours 15 minutes  
 D. 6 hours 30 minutes
18. According to one source, students should follow these rules.
- Do not carry backpacks that weigh more than 15% of your body weight.
  - Never carry backpacks that weigh over 25 pounds.
- Latoya weighs 120 pounds. What is the maximum weight of the backpack she should carry?
- A. 15 pounds  
 B. 18 pounds  
 C. 20 pounds  
 D. 25 pounds



19. Sam made the window box shown below.

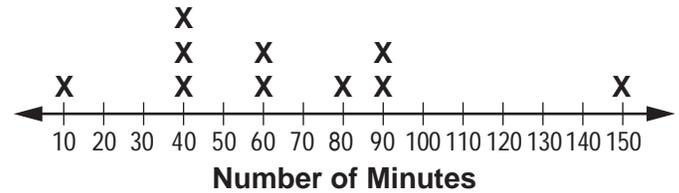


He decided it was too small so he made a new one by doubling the old one's dimensions. How much **more** dirt will the new window box hold?

- A. 2 times as much
  - B. 4 times as much
  - C. 6 times as much
  - D. 8 times as much
20. What is the least common multiple of 8 and 12?
- A. 2
  - B. 4
  - C. 24
  - D. 96

21. Mr. Chavez asked his students about how long they use the Internet each day. The results of his survey are shown below.

### Average Time Spent Daily on Internet

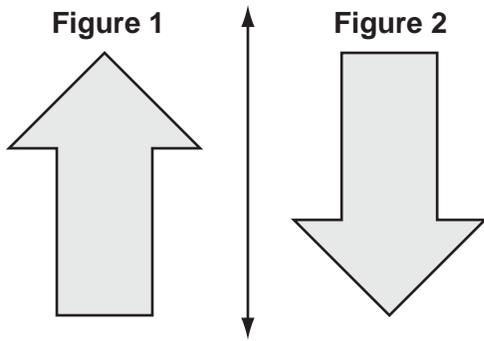


Based on these data, which statement is true?

- A. The mode is 40.
  - B. The mean is about 40.
  - C. The range is 50.
  - D. The median is 80.
22. Jenny measured the sides of rectangle  $ABCD$  and rectangle  $EFGH$ . These were her results:
- In rectangle  $ABCD$ ,  $AB = CD = 6$  and  $BC = AD = 2$ .
  - In rectangle  $EFGH$ ,  $EF = GH = 9$  and  $FG = EH = 3$ .
- Which statement describes the relationship between rectangle  $ABCD$  and rectangle  $EFGH$ ?
- A. The rectangles are congruent only.
  - B. The rectangles are similar only.
  - C. The rectangles are both congruent and similar.
  - D. The rectangles are neither congruent nor similar.



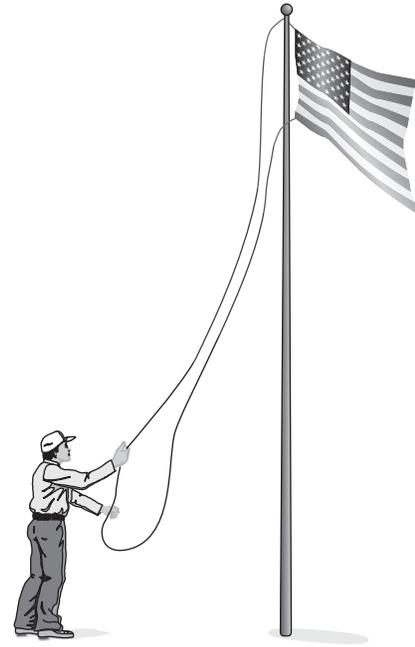
23. Figure 2 is the image of Figure 1.



Which statement describes the transformation?

- A. Figure 1 was reflected across the line.
- B. Figure 1 was translated across the line.
- C. Figure 1 was reflected across the line and then translated downward.
- D. Figure 1 was rotated 180 degrees and then reflected across the line.

24. The picture below shows Andre raising the flag.



Andre is approximately  $5\frac{1}{2}$  feet tall. About how tall is the flagpole?

- A. 10 feet
- B. 15 feet
- C. 20 feet
- D. 25 feet

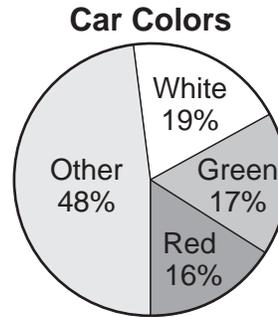


Write your answer to question 25 in the space provided for it in your Student Response Booklet. Show all of your work.

25. The manager of Standard Auto has been using the table below to keep track of the colors of cars his customers order. He made this graph to display the data.

**Car Colors**

Color	Percent of Customers
White	19%
Green	17%
Red	16%
Brown	10%
Black	6%
Silver	5%
Blue	13%



- Describe one advantage and one disadvantage of the graph the manager made of the data.
- On the grid in your Student Response Booklet, make a bar graph of the data in the table. Be sure to title your graph, label your axes, and show appropriate scale.

# Mathematics

## Session 2A (Calculator)

This test session includes multiple-choice questions and a question for which you must show your work or write out your answer. You may use a calculator during this session.

Mark your answers to questions 26 through 33 in the section marked "Mathematics—Session 2A (Calculator)" in your Student Response Booklet.

26. The cost,  $c$ , of a plaque is \$7.50 plus \$0.15 for each letter,  $l$ , that is engraved on the plaque. This is shown by the equation  $c = 7.50 + 0.15l$ . If a plaque costs \$12, how many letters were engraved on it?
- A. 30 letters
  - B. 72 letters
  - C. 80 letters
  - D. 130 letters

27. A rectangular prism has these dimensions: 4 inches by 6 inches by 4 inches. Which statement about the faces of the prism is true?
- A. They are all squares.
  - B. Two are squares, and four are rectangles that are not squares.
  - C. Four are squares, and two are rectangles that are not squares.
  - D. They are all rectangles that are not squares.

28. Van made the following pattern of squares using toothpicks.



He also made this table of the number of toothpicks needed to make each shape.

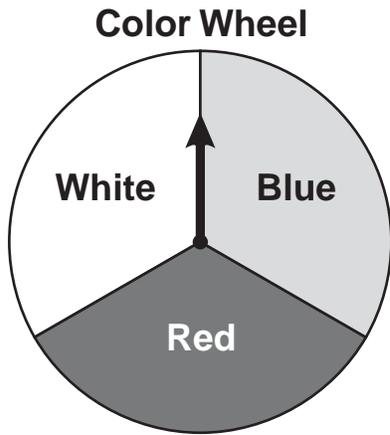
Squares	Toothpicks
1	4
2	7
3	10

Which expression shows the number of toothpicks Van needs for a shape with  $n$  squares?

- A.  $4n$
- B.  $n + 4$
- C.  $4n + 3$
- D.  $3n + 1$



29. At the Summer Carnival, each person gets a colored ticket (red, white, or blue). People who spin the color of their ticket on the color wheel win a free amusement ride.



The carnival manager expects 1800 people to come to the carnival. How many free amusement rides should the carnival manager expect to give away?

- A. 200 rides
- B. 300 rides
- C. 600 rides
- D. 900 rides

30. The chart below shows the members of the student council.

Grade	Boys	Girls
6	3	5
7	5	3
8	4	4

If one student council member is chosen at random to welcome new students, what is the probability that the person chosen will be a seventh-grade girl?

- A.  $\frac{1}{2}$
- B.  $\frac{1}{3}$
- C.  $\frac{1}{6}$
- D.  $\frac{1}{8}$



# Mathematics

## Session 2B (No Calculator)

This test session includes multiple-choice questions and questions for which you must show your work or write out your answer. You may NOT use a calculator during this session.

Mark your answers to questions 35 through 41 in the section marked “Mathematics—Session 2B (No Calculator)” in your Student Response Booklet.

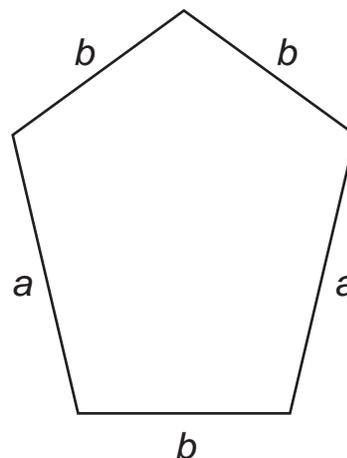
35. Kevin scored 48 points out of a possible 59 points on a test. Which of the following is the best estimate for the percent of questions he answered correctly?

A. 50%  
B. 60%  
C. 66%  
D. 80%

36. An artist combines 2 ounces of red paint and 1 ounce of yellow paint to make orange paint. He needs 9 ounces of orange paint. How many ounces of yellow paint will he have to use?

A. 3.0 ounces  
B. 4.5 ounces  
C. 6.0 ounces  
D. 7.5 ounces

37. Kent is planning a stained-glass window. He drew a plan and labeled the lengths of the sides as shown below.

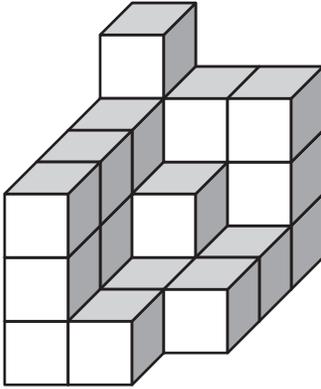


All of the expressions below show the total length around the window except which one?

- A.  $2a + 3b$   
B.  $2(a + b)$   
C.  $2(a + b) + b$   
D.  $a + b + b + a + b$



38. Craig works in a warehouse. He needs to count these crates.



How many crates are there?

- A. 15 crates
  - B. 17 crates
  - C. 25 crates
  - D. 34 crates
39. Eric has driven 90 miles since he filled his gas tank. He has  $\frac{3}{4}$  of a tank of gas left. If his gas tank holds 12 gallons, how many miles per gallon has he driven so far on this tank of gas?
- A. 10 miles per gallon
  - B. 15 miles per gallon
  - C. 25 miles per gallon
  - D. 30 miles per gallon



# Mathematics

## Session 3 (No Calculator)

This test session includes multiple-choice questions and questions for which you must show your work or write out your answer. You may NOT use a calculator during this session.

Mark your answers to questions 44 through 64 in the section marked "Mathematics—Session 3 (No Calculator)" in your Student Response Booklet.

44. At the 2002 USA Outdoor Championships in June 2002, Gail Devers won the finals of the 100-meter hurdle with a time of 12.51 seconds. Joyce Bates placed eighth with a time of 13.14 seconds. What was the difference in the times of the two athletes?
- A. 0.63 seconds
  - B. 1.63 seconds
  - C. 25.65 seconds
  - D. 63 seconds

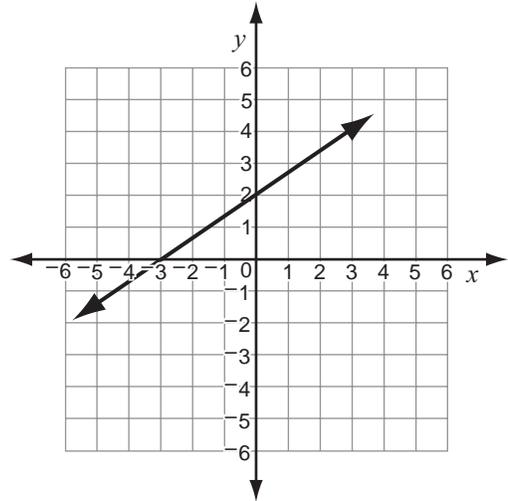
45. Greg made the table below to show the powers of 7.

Power	Value
$7^0$	1
$7^1$	7
$7^2$	49
$7^3$	343
$7^4$	2,401
$7^5$	16,807
$7^6$	117,649

What number is in the one's place of  $7^{10}$ ?

- A. 1
- B. 3
- C. 7
- D. 9

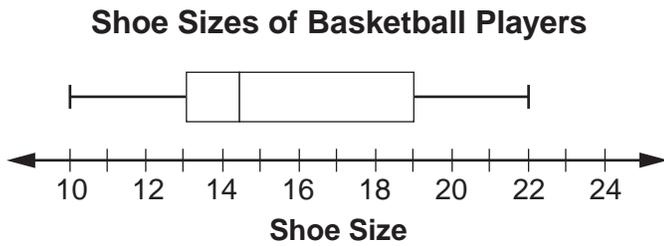
Use the graph below to answer question 46.



46. At what point does the line cross the  $x$ -axis?
- A.  $(-3, 0)$
  - B.  $(0, -3)$
  - C.  $(0, 2)$
  - D.  $(2, 0)$



47. Andrew collected statistics about the shoe size of basketball players. He displayed his information in the box-and-whisker plot shown below.



Based on the data shown, which statement **must** be true?

- A. At least one player has a shoe size of  $14\frac{1}{2}$ .
- B. At least one player has a shoe size of 21.
- C. The number of players with a shoe size less than  $14\frac{1}{2}$  is the same as the number of players with a shoe size greater than  $14\frac{1}{2}$ .
- D. The number of players with a shoe size less than 13 is the same as the number of players with a shoe size greater than 18.

48. The table below shows the fat content of 1-pound packages of four different kinds of meat.

<b>Fat Content of Four Different Kinds of Meat</b>	
<b>Meat</b>	<b>Fat Content</b>
ham	$\frac{1}{8}$
hamburger	0.12
lamb	$\frac{1}{9}$
turkey breast	3%

Which package has the **lowest** fat content?

- A. ham
  - B. hamburger
  - C. lamb
  - D. turkey breast
49. John left a 15% tip on a \$74 bill. What is the total amount he paid for the bill and tip?
- A. \$74.15
  - B. \$75.50
  - C. \$85.10
  - D. \$89.00



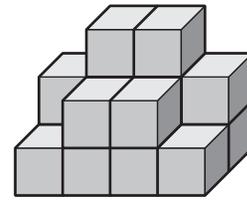
50. The formula  $p = 5s$  can be used to find the perimeter,  $p$ , of a regular pentagon with a side length,  $s$ . Regular pentagon  $A$  has a side length twice as long as regular pentagon  $B$ . How do the perimeters compare?

- A. The perimeter of pentagon  $A$  is 2 times the perimeter of pentagon  $B$ .
- B. The perimeter of pentagon  $A$  is 4 times the perimeter of pentagon  $B$ .
- C. The perimeter of pentagon  $A$  is 5 times the perimeter of pentagon  $B$ .
- D. The perimeter of pentagon  $A$  is 10 times the perimeter of pentagon  $B$ .

51. A gross is  $12^2$ . How many pencils are there in a gross of pencils?

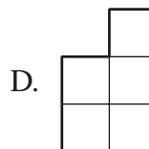
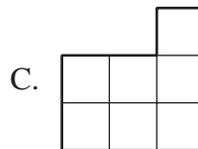
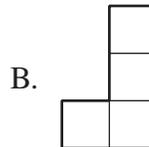
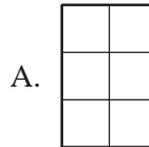
- A. 24
- B. 122
- C. 144
- D. 1200

52. This picture shows the model of a building.



**Front**

Which drawing shows its right-side view?



53. Mark is planning a five-day vacation for his family of four.

- The hotel will cost \$120 a night for 4 nights.
- A rental car will cost \$25.00 a day for 5 days.
- Other expenses, such as food, are estimated at \$100 per person.

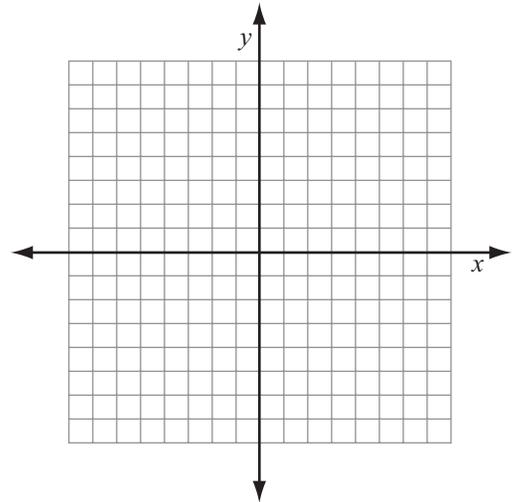
What is the approximate total expense for their five-day vacation?

- A. \$1225
- B. \$1005
- C. \$ 545
- D. \$ 245

54. The time it takes to plow a field can be found by multiplying the width (in feet) of the plow by the speed (in miles per hour) that the tractor is moving and dividing the product by 10. Which equation should be used to find the time,  $t$ , it will take to plow a field when the plow is  $f$  feet wide and the tractor moves  $s$  miles per hour?

- A.  $t = \frac{f+s}{10}$
- B.  $t = \frac{10}{f+s}$
- C.  $t = \frac{f \cdot s}{10}$
- D.  $t = \frac{10}{f \cdot s}$

You may use the grid below to answer question 55.



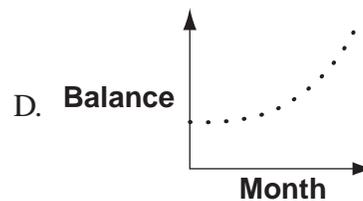
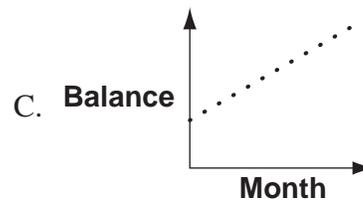
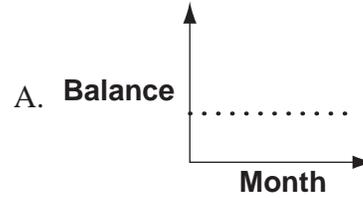
55. Jamal located the point (2, 6). Using this point as a vertex, he drew a rectangle that measured 3 units by 5 units. Which point could be the location of the opposite corner of the rectangle?

- A. (-1, 1)
- B. (-3, 1)
- C. (-1, 3)
- D. (1, -1)



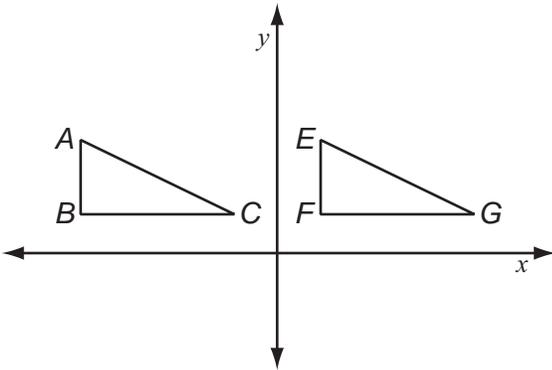
56. Jack is a carpet cleaner. He uses the equation  $c = 0.50f$  to calculate how much to charge,  $c$ , to clean  $f$  square feet of carpet. He has two different carpet cleaning jobs today. He will clean 1000 square feet at the first job and 4000 square feet at the second job. How do the costs for the two jobs compare?
- The cost for the second job is 2 times the cost of the first job.
  - The cost for the second job is 4 times the cost of the first job.
  - The cost for the second job is 6 times the cost of the first job.
  - The cost for the second job is 8 times the cost of the first job.
57. There are six seniors on the girls' basketball team. Each year, the team votes for two seniors to co-captain the team. How many different co-captain pairs are possible?
- 12
  - 15
  - 18
  - 30

58. One year ago, Janet had \$50 in her savings account. She put the same amount of money in the account each month. Her balance is now three times the amount she had when she started. Which graph represents the amount of money in her savings account over the last year?



59. The national debt for the United States is approximately \$2.4 trillion. What is 2.4 trillion in standard form?
- 2,000,000,000,000.4
  - 2,000,000,000,004
  - 2,400,000,000,000
  - 24,000,000,000,000

Use the graph below to answer question 60.



60. Triangle  $EFG$  is the image of triangle  $ABC$ . What transformation created the image?
- a reflection across the  $x$ -axis
  - a reflection across the  $y$ -axis
  - a translation across the  $x$ -axis
  - a translation across the  $y$ -axis

61. Lea wants to buy a new stereo that costs \$100. She has put together this plan to save the money she needs.

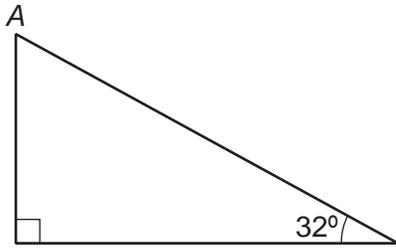
Month	Money Saved
Starting Balance	\$ 50.00
1	\$ 60.00
2	\$ 70.00
3	\$ 80.00
4	\$ 90.00
5	\$100.00

Which equation represents how much money,  $s$ , Lea will have saved after  $m$  months?

- $s = 50m$
  - $s = 60m$
  - $s = 50 + 10m$
  - $s = 10 + 50m$
62. An item at a store is marked 45% off. What percent of the original price will the item cost?
- 0.55%
  - 45%
  - 55%
  - It depends on the original price of the item.



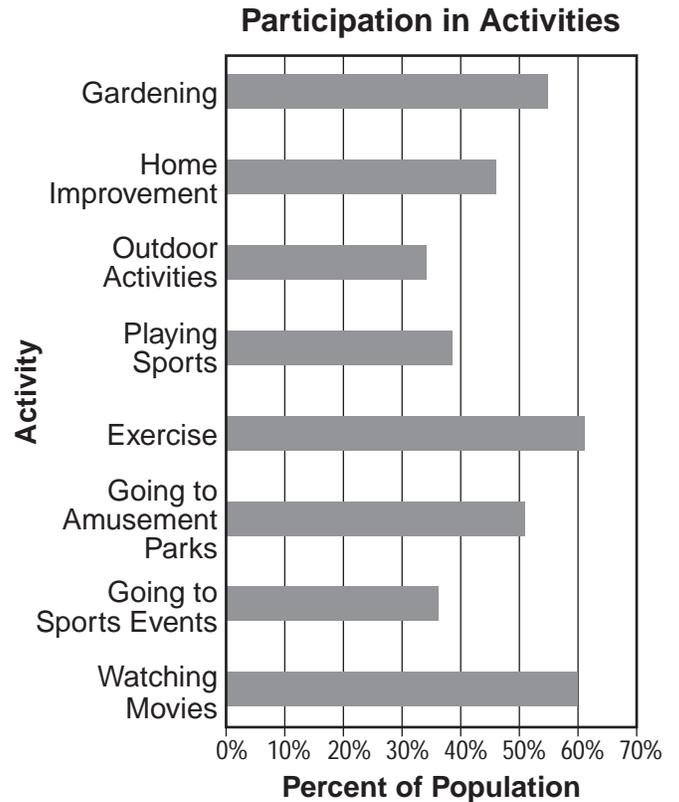
63. Lowell is building the ramp shown below.



The ramp incline is  $32^\circ$ . What is the measure of angle  $A$ ?

- A.  $32^\circ$
- B.  $58^\circ$
- C.  $90^\circ$
- D.  $148^\circ$

64. The table below shows the results of a survey held to determine the percent of the population that participates in certain activities in a town.



Based on these data, which statement is true?

- A. More than half of the town's population go to amusement parks.
- B. Gardening is popular with all different age groups.
- C. Going to sporting events costs more than going to an amusement park.
- D. Almost half of the homes in the United States need improvement.



Write your answers to questions 65 through 67 in the spaces provided in your Student Response Booklet. Show all of your work.

65. What is the value of this expression?

$$2\left(\frac{8}{23} \times \frac{23}{8}\right) - \frac{15}{15}$$

Show all of your work.

66. State police use this equation to calculate the stopping distance,  $d$ , in feet, of a car traveling  $s$  miles per hour.

$$d = (s + s^2) \div 20$$

A man in a collision with a deer claims that he had been traveling 30 miles per hour just before the collision occurred. If he is correct, what would have been his stopping distance?

Show all of your work.

67. What is the value of this expression?

$$3 \times 6 - 4 + 8 \div 2$$

Show all of your work.



Write your answer to question 68 in the space provided for it in your Student Response Booklet. Show all of your work.

68. Mr. Brady and Mrs. Johnson have a total of 60 boys and 48 girls in their physical education classes. The teachers want to combine the classes, and then use these three rules to divide the students into smaller groups.
- Each group must contain both boys and girls.
  - There must be an equal number of girls in each group.
  - There must be an equal number of boys in each group.
- a. Separate the students in three different ways using the rules above. For **each** of your three ways, be sure to tell how many boys and how many girls would be in each group and how many groups there would be. Show all of your work.
- b. Is it possible to use the three rules to split the students into 5 groups? Explain your answer.