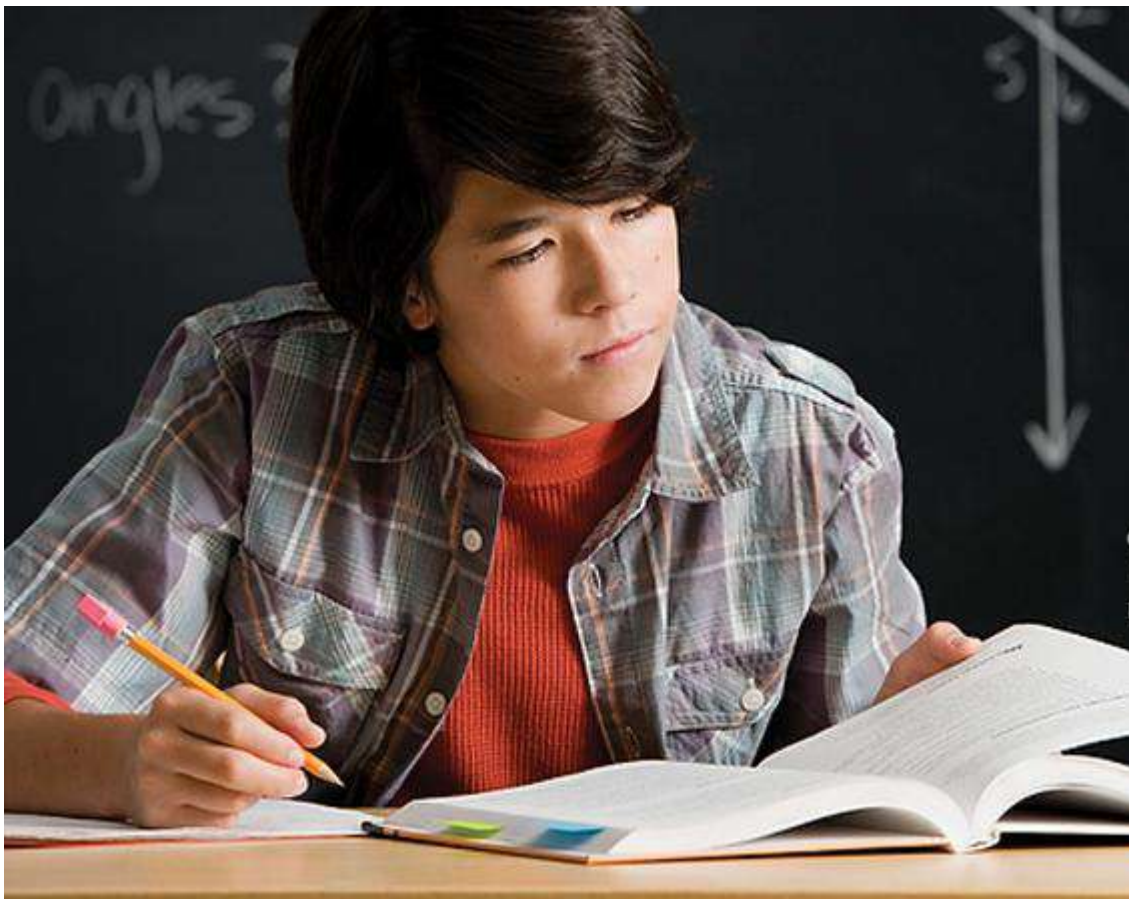


# *NAEP 2011*

## Released Mathematics Items Grade 4



## National Assessment of Educational Progress (NAEP)

NAEP is the largest nationally representative assessment of what America's students know and can do. Assessment results are widely discussed in the press and are used by policymakers, educators, and researchers to make decisions about education policy and funding.

This booklet includes released examples of actual NAEP items from the grade 4 assessment. Educators can review these items and use them in their classrooms in order gain a better understanding of the assessment and to evaluate how their students would perform on NAEP.

If you have any questions or comments regarding NAEP or would like to view previous report cards, please visit the NAEP website at <http://nces.ed.gov/nationsreportcard>. Also available through the website is the NAEP Questions Tool (<http://nces.ed.gov/nationsreportcard/itmrlsx>) which allows you to review additional sample questions with sample answers.

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### The Mathematics Assessment

The NAEP mathematics assessment at grade 4 measures students' ability to solve problems in five mathematics content strands: Number Properties and Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability; and Algebra. Within each of these five content strands, students are asked questions that involve low, moderate, and high mathematical complexity.

The mathematics assessment includes multiple-choice questions, short constructed-response questions, and extended constructed-response questions. The constructed-response questions allow students to communicate their ideas and demonstrate the reasoning they used to solve problems. The short-answer and extended-response questions make up approximately 50 percent of student assessment time.

For more information regarding the mathematics assessment framework please visit the National Assessment Governing Board's website at <http://www.nagb.org/publications/frameworks.htm>.

### NAEP Reading Framework Distribution of Question Pool Across Content Strands

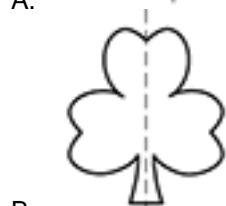
Number Properties and Operations	40%
Measurement	20%
Geometry	15%
Data Analysis, Statistics, and Probability	10%
Algebra	15%

# NAEP 2011 – Grade 4 Mathematics

1.  $(47 \times 75) \div 25 =$

- A. 141
- B. 1,175
- C. 3,525
- D. 4,700

2. Which decoration CANNOT be folded along the dotted line so that both parts match?



3. Which unit would probably be used to measure the length of a book?

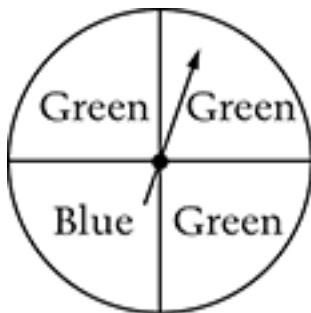
- A. Inches
- B. Yards
- C. Square inches
- D. Square yards

4. Park School has 316 students. For field day, the students are put into 4 teams with the same number of students on each team. How many students are on each team?

- A. 79
- B. 312
- C. 320
- D. 1,264

5. Multiply: 
$$\begin{array}{r} 8.5 \\ \times 4.9 \\ \hline \end{array}$$

Answer: \_\_\_\_\_

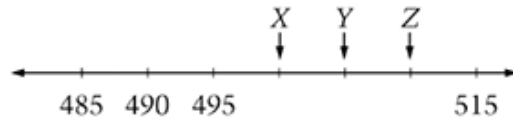


6. Ms. Livingston's class spins the arrow on the spinner 92 times. Of the following, which is the most likely result?

- A. 66 green, 26 blue
- B. 46 green, 46 blue
- C. 23 green, 69 blue
- D. 2 green, 90 blue

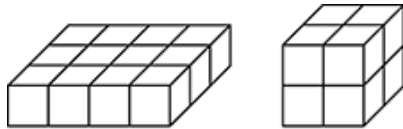
7. Patty expects that each tomato plant in her garden will bear 24 tomatoes. If there are 6 tomato plants in her garden, how many tomatoes does she expect?

- A. 4
- B. 18
- C. 30
- D. 144



8. On the number line above, what is the sum of the numbers to which the arrows X, Y, and Z point?

- A. 1,491
- B. 1,515
- C. 1,530
- D. 1,545

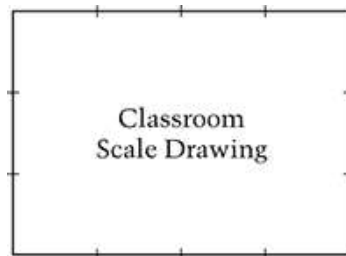


Solid A

Solid B





9. How many more small cubes were used to make Solid A than Solid B?

- A. 2
- B. 4
- C. 6
- D. 7



Scale:  = ?

10. The picture shows Jackie's scale drawing of her classroom. Which scale did she use?

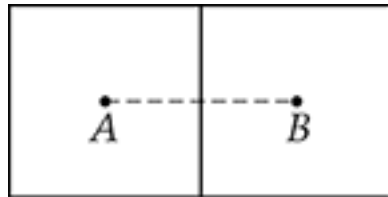
- A.  = 1 inch
- B.  = 10 feet
- C.  = 100 feet
- D.  = 1 mile

11. Sam's school is trying to collect one million pennies.  
Write this amount as a number.

\_\_\_\_\_ pennies

So far, the school has collected 513,462 pennies. How many more pennies does the school need to collect to reach one million?


\_\_\_\_\_ pennies



12. Each square above is 10 units on a side. Points A and B are the centers of the squares. What is the distance between A and B?
- A. 5 units
  - B. 10 units
  - C. 15 units
  - D. 20 units


FAVORITE ICE-CREAM FLAVORS OF FOURTH GRADERS

Class	Number Who Chose Vanilla	Number Who Chose Chocolate
Mr. Kennedy	6	12
Ms. Ying	8	10
Mrs. Delgado	7	13
Mrs. Findley	9	15

13. The table lists the favorite ice-cream flavors of four classes of fourth graders. On the graph below, use one  to represent 10 children. Draw the correct number of faces on the graph to show the favorite flavors of the fourth graders.

FAVORITE ICE-CREAM FLAVORS

Number Who Chose Vanilla	
Number Who Chose Chocolate	

 = 10 children

14. Every 30 minutes Dr. Kim recorded the number of bacteria in a test tube.

Time	Number of Bacteria
1:00 P.M.	600
1:30 P.M.	1,190
2:00 P.M.	2,390
2:30 P.M.	4,800

Which best describes what happened to the number of bacteria every 30 minutes?

- A. The number of bacteria increased by 500.
- B. The number of bacteria increased by 1,000.
- C. The number of bacteria doubled.
- D. The number of bacteria tripled.

## MOVIE TIMES

Early Show      3:15

Late Show      7:30

15. The early show and the late show for a movie last the same amount of time. The early show begins at 3:15 P.M. and ends at 4:27 P.M. The late show begins at 7:30 P.M. At what time does the late show end?

Show your work.

16. Which unit would be best to measure the amount of liquid in a spoonful of lemon juice?

- A. Milliliters
- B. Liters
- C. Millimeters
- D. Meters

17. While Adisha's parents were looking for a car, Adisha counted the number of cars and trucks in the lot of the sales office.

She counted:

25 new cars  
16 used cars  
59 trucks

How many more trucks than cars are there on the lot?

Write directions for how to use a calculator to solve this problem.

$$4 \text{ quarts} = 1 \text{ gallon}$$

18. Amy wants to put 8 gallons of water into her aquarium. She has a 2-quart pitcher to carry water from the sink. How many times will she need to fill her pitcher?

- A. 4
- B. 10
- C. 16
- D. 32



# AMUSEMENT PARK

*70 things to do!*

34 rides  
plus games  
plus shows

19. An amusement park has games, rides, and shows.

- The total number of games, rides, and shows is 70.
- There are 34 rides.
- There are two times as many games as shows.

How many games are there? \_\_\_\_\_

How many shows are there? \_\_\_\_\_

Use numbers, words, or drawings to show how you got your answer.

If you need more room for your work, use the space below.

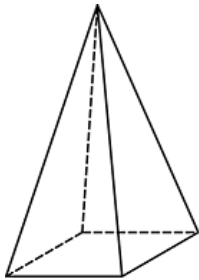


20. What is being measured in the picture above?

- A. The time it takes to deliver the package
- B. The area of the package
- C. The length of the package
- D. The weight of the package

21. What number is 10,000 more than 333,333?

- A. 333,433
- B. 334,333
- C. 343,333
- D. 433,333



Square Pyramid

22. What shapes make up the faces of a square pyramid?

- A. Triangles only
- B. Pentagon and triangles
- C. Square and rectangles
- D. Square and triangles

23. Tanika wrote 100 in four different ways.

$$\begin{array}{cc} 85 + 15 & 70 + 30 \\ 141 - 41 & 200 \div 2 \end{array}$$

Write 100 in four other ways. Do not use the numbers that Tanika used.

24. Add:  
 $20,000 + 790,000 =$

- A. 792,000
- B. 810,000
- C. 811,000
- D. 990,000

25. Mr. Bell's class voted for where they want to go on their school trip.  
The chart shows the students' votes.

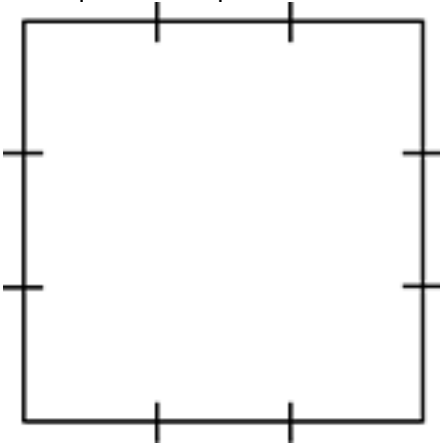
### SCHOOL TRIP

Place	Votes
City park	
Museum	
Theater	

How many more students voted to go to the theater than to go to the city park?

- A. 3
- B. 4
- C. 11
- D. 15

26. The square has a perimeter of 12 units.



What is the area of the square?

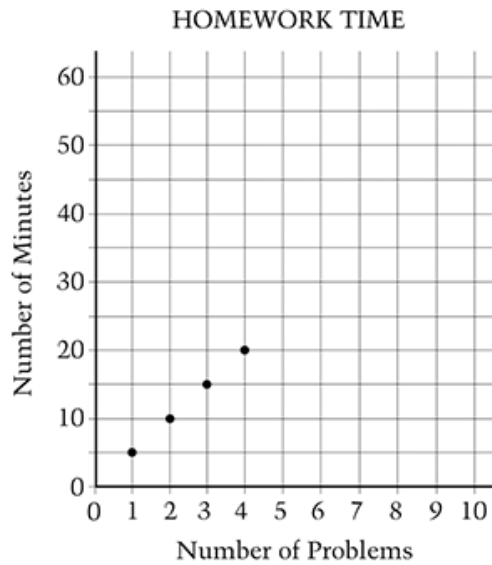
- A. 6 square units
- B. 8 square units
- C. 9 square units
- D. 12 square units

27. Subtract:

$$\begin{array}{r} 6,090 \\ - 4,843 \\ \hline \end{array}$$

- A. 1,147
- B. 1,247
- C. 2,257
- D. 2,853

28. The graph shows the total number of minutes it took Selena to do math problems.



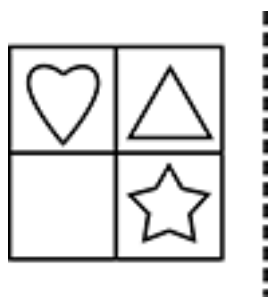
How many minutes did it take her to do 3 problems?

Answer: \_\_\_\_\_ minutes

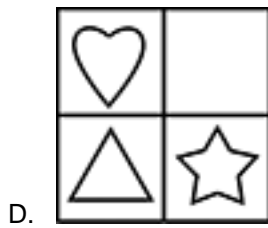
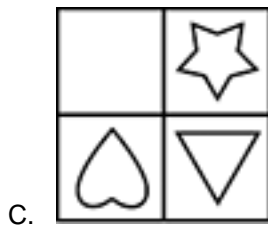
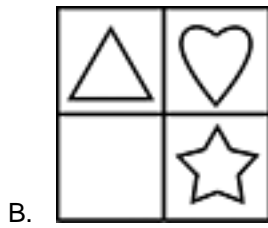
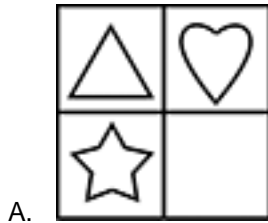
Selena continues to work at the same rate.

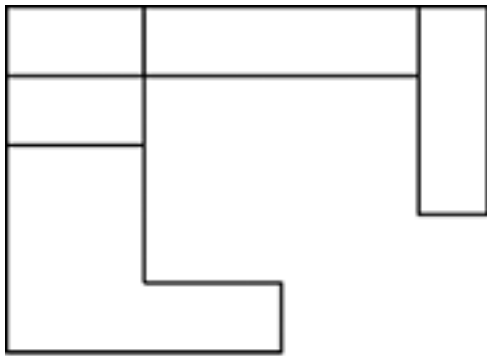
How many problems will she do in 40 minutes?


Answer: \_\_\_\_\_ problems



29. Tony flips the figure over the dotted line. Which picture shows the result of the flip?





 = 2 square feet

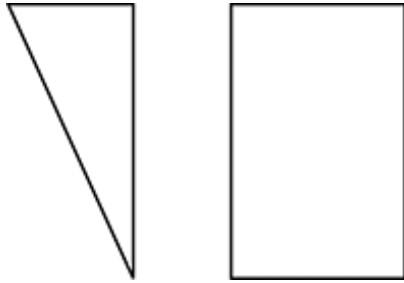
30. Which is the best estimate for the area of the figure?
- A. Less than 10 square feet
  - B. More than 10 square feet but less than 15 square feet
  - C. More than 15 square feet but less than 25 square feet
  - D. More than 25 square feet

31. Mr. Jones picked a number greater than 100.  
He told Gloria to divide the number by 18.  
He told Edward to divide the number by 15.

Whose answer is greater?

Gloria's       Edward's

Explain how you know this person's answer will always be greater for any number that Mr. Jones picks.



32. How are the right triangle and the rectangle alike?

- A. Each figure has at least one right angle.
- B. Each figure has parallel sides.
- C. Each figure has at least one line of symmetry.
- D. Each figure has at least two sides that are the same length.

33. Sam folds a piece of paper in half once. There are 2 sections.



Sam folds the paper in half again. There are 4 sections.

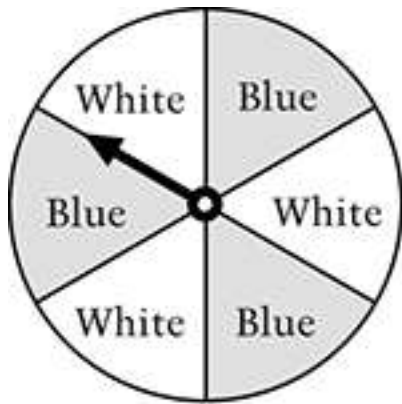


Sam folds the paper in half again. There are 8 sections.

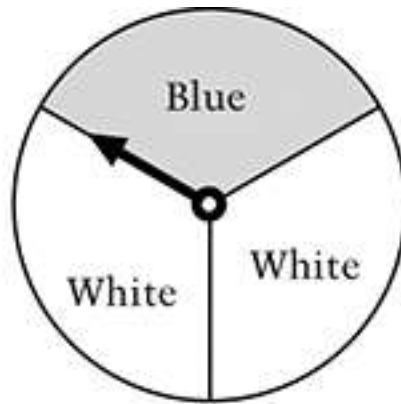
Sam folds the paper in half two more times.

Which list shows the number of sections there are each time Sam folds the paper?

- A. 2, 4, 8, 10, 12
- B. 2, 4, 8, 12, 24
- C. 2, 4, 8, 16, 24
- D. 2, 4, 8, 16, 32



Spinner A



Spinner B

34. Lori has a choice of two spinners. She wants the one that gives her a greater probability of landing on blue.

Which spinner should she choose?



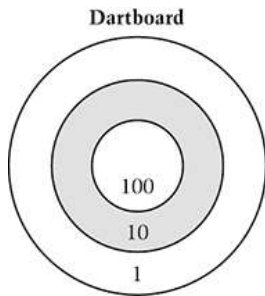
Spinner A



Spinner B

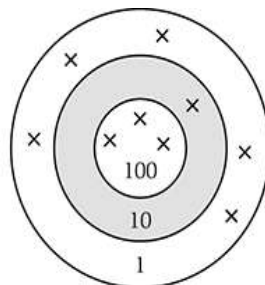
Explain why the spinner you chose gives Lori the greater probability of landing on blue.





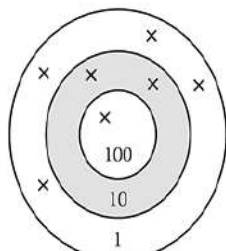
35. A dartboard has three separate areas.  
 Darts that land in the inner circle earn 100 points each.  
 Darts that land in the middle ring earn 10 points each.  
 Darts that land in the outer ring earn 1 point each.

Jill threw 9 darts  
 Each × marks a spot where one of Jill's darts landed.  
 What was Jill's score?  
 Answer: \_\_\_\_\_ points



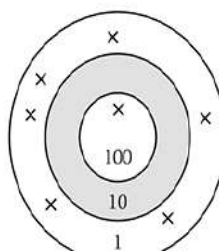
**Jill's Turn**

Kevin threw 7 darts, and they landed as shown  
 He has 2 more darts to throw.



**Kevin's Turn**

Ruth threw 7 darts, and they landed as shown.  
 She has 2 more darts to throw.



**Ruth's Turn**

The person who has the highest score after throwing 9 darts wins the game.

- Can Jill win the game?       Yes       No
- Can Kevin win the game?       Yes       No
- Can Ruth win the game?       Yes       No

Explain how you know which players can win and which players cannot win.

36. Ralph needs to know the length of the floor in his room. Which of these tools should he use to find the length?
- A. Balance scale
  - B. Compass
  - C. Tape measure
  - D. Thermometer

ZOO ATTENDANCE

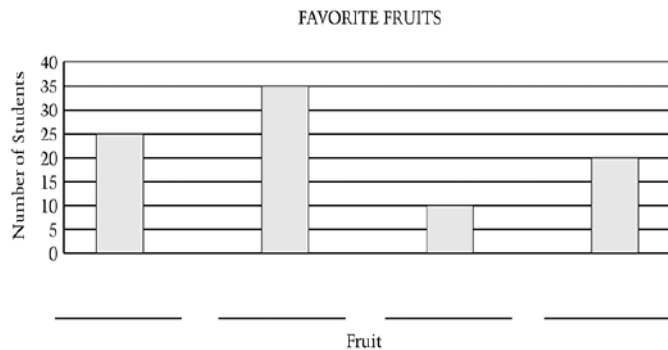
Day	Adults	Children
Thursday	757	649
Friday	774	742
Saturday	792	788
Sunday	801	726

37. The table shows the number of adults and children who went to the zoo.  
On what day was the number of adults who went to the zoo about the same as the number of children who went to the zoo?
- A. Thursday
  - B. Friday
  - C. Saturday
  - D. Sunday

38. What value of  $n$  makes the number sentence  $n + 4 = 12$  true?
- A. 3
  - B. 4
  - C. 8
  - D. 16

39. The graph below shows students' favorite fruits.  
Use these clues to label the bars with the correct fruit.

- Twice as many students chose apples as grapes.
- Five more students chose peaches than apples.
- Ten more students chose bananas than peaches.



Write the correct fruit on the lines above.



40. The three digits above can be used to make 6 different 3-digit numbers.  
If one of the 3-digit numbers is picked at random, what are the chances that it will be an odd number?
- A. Impossible
  - B. Possible but not very likely
  - C. Very likely but not certain
  - D. Certain

$$\begin{array}{r} 74 \\ \times 16 \\ \hline \end{array}$$

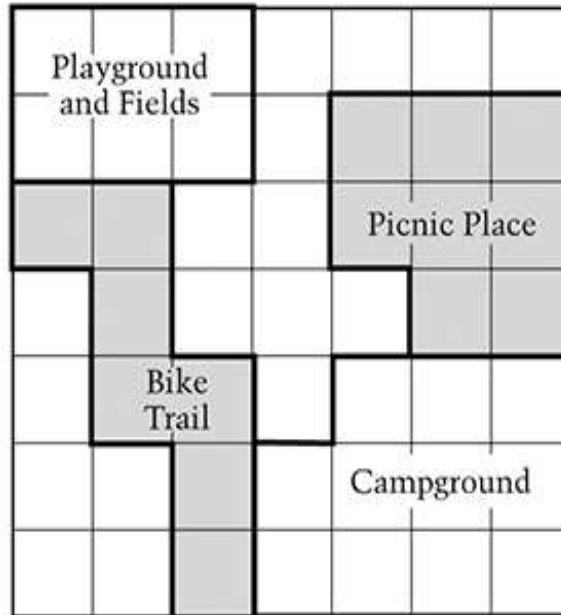
- 41.
- A. 90
  - B. 518
  - C. 1,164
  - D. 1,184



42. On the scale above, 2 cylinders balance 1 cube. Which of the scales below would balance?

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

CITY PARK



= 10 sq units

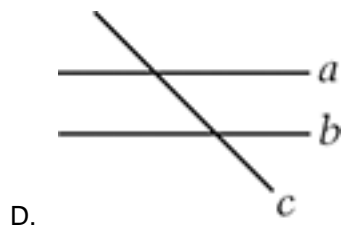
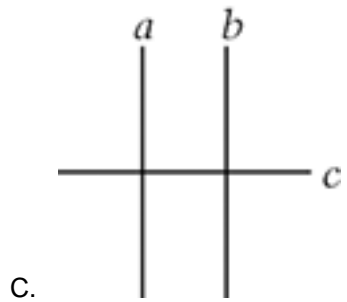
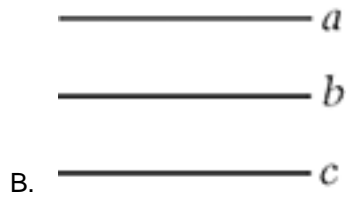
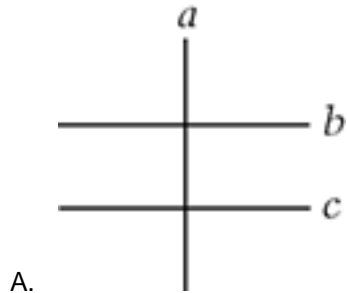
43. A map of City Park is shown above. The area of the whole park is 490 square units. The Bike Trail and the Picnic Place together occupy how many square units of the park's area?

- A. 70  
 B. 80  
 C. 150  
 D. 220

44. Lines  $a$  and  $b$  are parallel to each other.  
Line  $c$  is perpendicular to these lines.

Jan correctly draws lines  $a$ ,  $b$ , and  $c$ .

Which of these could be Jan's drawing?



45. Which factor of 12 is missing in this list of numbers?  
1, 2, 3, 4, \_\_, 12

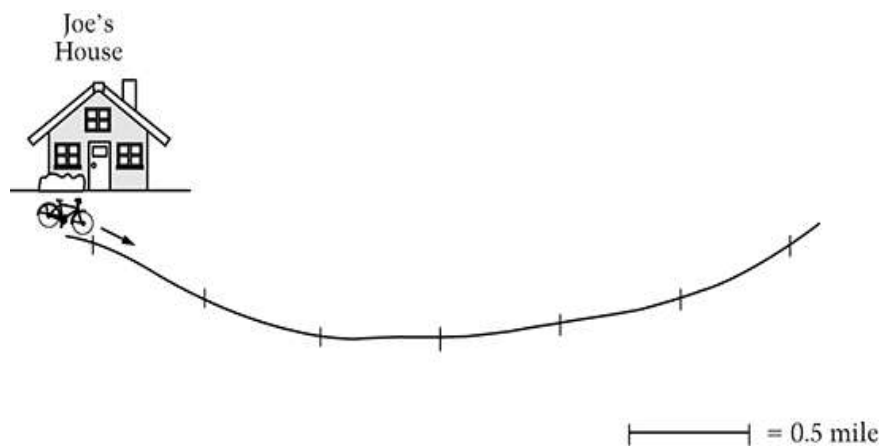
- A. 5
- B. 6
- C. 8
- D. 10

46. A student had to multiply  $328 \times 41$ . The student's answer was 4,598.  
Use estimation to explain why this answer is not reasonable.

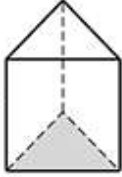
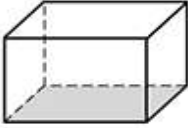
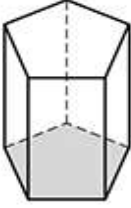
47. Joe rode his bicycle from his house to his friend's house.  
He rode 1.7 miles along the path below.

The path is marked every 0.5 mile.

Put an X on the path to show how far Joe rode to his friend's house.

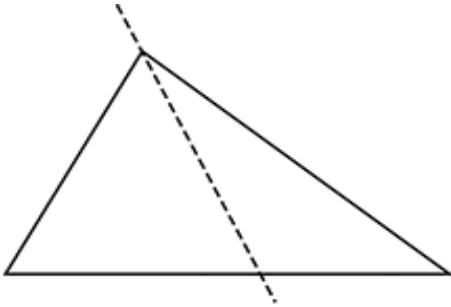


48. Ms. Kim has 45 stickers that she wants to give out to 6 students. The students are sitting in a circle. Ms. Kim gives out one sticker at a time and keeps going around the circle until all the stickers are gone. How many of the students will get more than 7 stickers?
- A. 2
  - B. 3
  - C. 5
  - D. 6

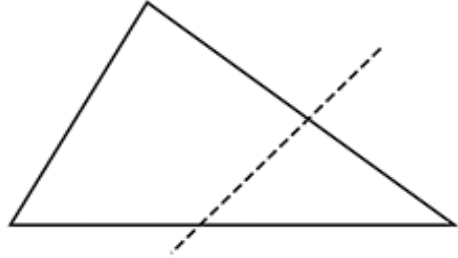
Shape	Number of Edges
Triangular Prism 	9
Rectangular Prism 	12
Pentagonal Prism 	15

49. The table shows the number of edges for each prism. What is the number of edges for a prism if the bottom face has 7 sides?
- A. 18  
 B. 20  
 C. 21  
 D. 22
50. Each of the 18 students in Mr. Hall's class has  $p$  pencils. Which expression represents the total number of pencils that Mr. Hall's class has?
- A.  $18 + p$   
 B.  $18 - p$   
 C.  $18 \times p$   
 D.  $18 \div p$

51. When a triangle is divided by a straight line, these results are possible.

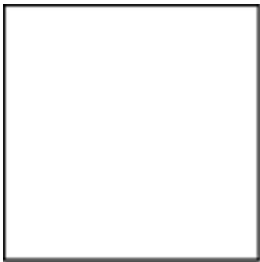


Two triangles

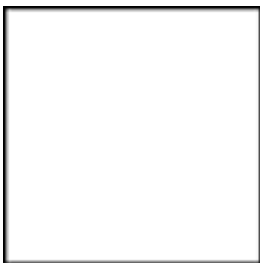


A triangle and  
a quadrilateral

Draw one straight line to divide the square below into two rectangles.



Draw one straight line to divide each square below into two shapes that are not rectangles.  
The results should be different for each square.



You do not need to give the names of your shapes.







For more information:

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