

2012-13 NAEP Training

Grade 4 Mathematics Sample Items

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2012-13 NAEP Training

Grade 4 Mathematics Sample Items

Part 1:
Prior Year New York State Test Items



New York State Testing Program

Mathematics Test Book 2

Grade **4**

May 5–7, 2010

Name _____

31

Lisa collects baseball cards. She has 4,381 baseball cards in her collection. She sells 1,427 of her baseball cards. How many baseball cards does Lisa have left?

Show your work.

Answer _____ baseball cards

Go On

The table below shows the number of concert tickets sold during two days.

CONCERT TICKETS SOLD

Day	Number of Tickets
Thursday	125
Friday	136

Write a number sentence that compares the number of tickets sold on Thursday with the number of tickets sold on Friday. Use $>$, $<$, or $=$ in the number sentence.

Number sentence _____

The statements below describe the number of tickets sold on Saturday.

Saturday's ticket sales $<$ 138.

Saturday's ticket sales $<$ Friday's ticket sales.

Saturday's ticket sales $>$ 134.

How many tickets sold on Saturday?

Answer _____ tickets

33

Thomas buys a skateboard that is 2 feet long. What is the length, in **inches**, of the skateboard?

Show your work.

Answer _____ inches

Go On

34

Melissa has a rope that is 84 feet long. She is cutting it into 7-foot pieces to make jump ropes. How many jump ropes can Melissa make?

Show your work.

Answer _____ jump ropes

35

A restaurant had a total of 28 customers sitting at 14 tables. The same number of customers was sitting at each table. Complete the number sentence below that can be used to find the number of customers sitting at each table.

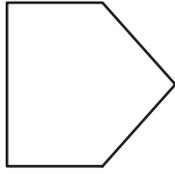
Number sentence $28 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Complete the number sentence below that can be used to **check** your work.

Number sentence $\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 28$

Go On

36 Shelly drew the figure below.



Based on the number of sides, what is the name of the figure?

Answer _____

How many angles are in the figure Shelly drew?

Answer _____ angles

- 37** Milton takes \$400 on a shopping trip. He plans to spend $\frac{1}{5}$ of his money on DVDs. How much money will Milton spend on the DVDs?

Show your work.

Answer \$ _____

Go On

38

Sharrline made the pictograph below to show the number of students from different grades who walk to school every day.

STUDENTS WALKING TO SCHOOL

KEY	
	= 4 students

Grade	Number of Students
1	 
2	   
3	  
4	     

Complete the **table** below to show the number of students in each grade who walk to school every day.

Be sure to

- title the table
- label the first column
- enter all the data

	Number of Students
1	6

How many **fewer** Grade 3 students walk to school than Grade 4 students?

Answer _____ students

Go On

Part A

Megan writes a number pattern. The rule is to subtract 3 from a number to get the next number. Complete Megan's pattern below by writing the missing numbers on the lines.

50, _____, 44, _____, 38, 35

Part B

Joseph writes the number pattern below.

100, 101, 96, 97, 92, 93, 88, 89, _____?

What is the **next** number in his pattern?

Answer _____

On the lines below, explain how you found the next number in Joseph's number pattern.

STOP

2012-13 NAEP Training

Grade 4 Mathematics Sample Items

Part 2:
Common Core-aligned 2012-13 New
York State Sample Items



New York State Testing Program

Mathematics Common Core Sample Questions

Grade 4

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Domain: Operations and Algebraic Thinking

Item: CR

1

Candy wants to buy herself a new bicycle that costs \$240. Candy has already saved \$32, but she needs to make a plan so she can save the rest of the money she needs. She decides to save the same amount of money, x dollars, each month for the next four months.

Part A: Write an equation that helps Candy determine the amount of money she must save each month.

Equation _____

Part B: Solve the equation to find the amount of money she must save each month to meet her goal of buying a bicycle.

Show your work.

Answer \$ _____

Key:

Part A: $\frac{(240 - 32)}{4} = x$ or $32 + 4x = 240$ or equivalent equation

Part B: $\frac{(240 - 32)}{4} = x$

$$\frac{208}{4} = x$$

$$52 = x$$

or other valid process.

AND

Answer: \$52

Aligned CCLS: 4.OA.3

Commentary: This question aligns to CCLS 4.OA.3 and assesses a student's ability to solve a multi-step word problem posed with whole numbers. It also assesses the ability to represent a problem using an equation with a letter standing for the unknown quantity.

Rationale: In Part A the equation includes the subtraction of \$32 from \$240 to identify how much is needed to be saved in four months and the division of the remaining amount, \$208, by four to represent the amount to be saved each month. Likely errors may include dividing \$240 by four without subtracting the already saved amount of \$32 ($\frac{240}{4} = 60$) or using \$32 dollars as the amount of money saved during the first month and dividing the remaining amount by three ($\frac{(240-32)}{3} = 69.\overline{33}$). In Part B errors may occur during the computation of the equation in Part A or may be the result of accurate computations based on an inaccurate equation from Part A.

2

Students from three classes at Hudson Valley Elementary School are planning a boat trip. On the trip, there will be 20 students from each class, along with 11 teachers and 13 parents.

Part A: Write an equation that can be used to determine the number of boats, b , they will need on their trip if 10 people ride in each boat.

Equation: $b =$ _____

Part B: How many boats will be needed for the trip if 10 people ride in each boat?

Show your work.

Answer: _____ boats

Part C: It will cost \$35 to rent each boat used for the trip. How much will it cost to rent all the boats needed for the trip?

Show your work.

Answer: \$ _____

Key:

Part A: $b = \frac{[20(3) + 11 + 13]}{10}$

Part B: Work:

$$b = \frac{84}{10}$$

$$b = 8 \text{ R } 4$$

The number of boats needed is $8 + 1 = 9$ boats

Answer: 9 boats

Part C: Total Cost = $35 \times 9 = 315$

Answer: \$315

Aligned CCLS: 4.OA.3

Commentary: This question aligns to CCLS 4.OA.3 and assesses a student's ability to solve a multi-step word problem posed with whole numbers. It also tests the student's ability to represent the problem using an equation, with a letter standing for the unknown quantity. It tests a student's ability to interpret the remainder of the division problem and use this interpretation properly to determine the number of boats as well as the total cost.

Rationale: The equation in Part A includes a calculation for the number of students who went on the trip ($20 \times 3 = 60$) plus the 11 teachers and 13 parents, bringing the total to 84 individuals on the trip. The number of boats, b , needed is the sum of all individuals divided by the number of people able to sit in a single boat. In Part B, students perform the calculation—84 is divided by 10, to get 8 R 4. The remainder of 4 indicates that an additional boat is needed, so the number of boats needed is $8 + 1 = 9$ boats. In Part C, the total cost is the number of boats required multiplied by the cost per boat, $\$35 \times 9 = \315 .

Domain: Number and Operations—Fractions

Item: CR

- 3** Elena, Matthew, and Kevin painted a wall. Elena painted $\frac{5}{9}$ of the wall and Matthew painted $\frac{3}{9}$ of the wall. Kevin painted the rest of the wall.

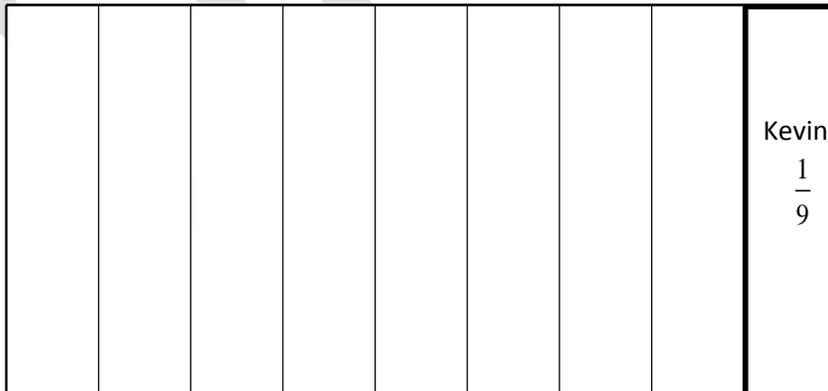
Part A: Use the box below to represent the wall. Show the fraction of the wall that Kevin painted.



Part B: What fraction of the wall did Kevin paint? _____

Key:

Part A:



AND

Part B: $\frac{1}{9}$

Aligned CCLS: 4.NF.3d

Commentary: This question is aligned with CCLS 4.NF.3d and assesses a student’s ability to solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators by using visual fraction models and equations to represent the problem.

Rationale: The wall should be partitioned into nine equal pieces, and the portion Kevin painted should be indicated. Determining the fraction Kevin painted may be solely completed via the visual model. However, the use of equations may also be used to determine the fraction Kevin painted. Matthew and Elena completed $\frac{5}{9} + \frac{3}{9} = \frac{8}{9}$. Since the entire job represents 1 whole, $\frac{8}{9}$ is subtracted from 1 ($1 - \frac{8}{9} = \frac{1}{9}$).

Domain: Measurement and Data

Item: CR

4

The area of Ken’s rectangular garden is 480 square feet. The garden is 24 feet wide. What is the length of fencing Ken will need to buy in order to fence in the garden completely on all four sides?

Show your work.

Answer: _____ feet

Key:

$$\text{Length of the garden: } \frac{480}{24} = 20 \text{ feet}$$

$$\text{Perimeter: } 2 \times (20 + 24) = 88 \text{ feet}$$

Answer: 88 feet.

Aligned CCLS: 4.MD.3

Commentary: This question aligns to CCLS 4.MD.3 because it assesses a student’s ability to apply the area and perimeter formulas in a real-world situation.

Rationale: Using the formula $\text{area} = \text{length} \times \text{width}$, the length of the garden can be found by solving the equation $(480 = \text{length} \times 24)$, dividing the area by the width of the garden: $\frac{480}{24} = 20$. Calculating the length of fencing needed to surround the garden on all four sides requires the use of both length and width: $2 \times (20 + 24) = 88$ feet.

Domain: Measurement and Data

Item: CR

5

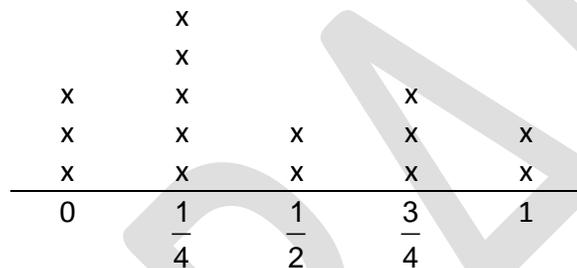
Lisa recorded the approximate amount of time, in hours, it took her to do her homework each day for 15 days.

$\frac{1}{4}, \frac{1}{2}, 0, 1, \frac{3}{4}, \frac{1}{4}, \frac{1}{2}, 0, 1, \frac{3}{4}, \frac{1}{4}, \frac{1}{4}, \frac{3}{4}, 0, \frac{1}{4}$

In the space below, create a line plot to represent Lisa's data. Be sure to label the x-axis and title the line plot.

Key:

Lisa's Approximate Homework Times (in hours)



Aligned CCLS: 4.MD.4

Commentary: This question aligns to CCLS 4.MD.4. It assesses a student's ability to display a data set of measurements in fractions of a unit and make a line plot to display that data.

Rationale: The set of data contains five unique values, including the fractions $\frac{1}{4}$, $\frac{1}{2}$, and

$\frac{3}{4}$. All of these values are plotted on the number line, and each occurrence of that number receives an x to represent each unique occurrence. The axis should be properly labeled, and the line plot titled.

Domain: Operations and Algebraic Thinking

Item: MC

6

Which of the number patterns below follows the rule *subtract 7* to get to the next number?

- A** 79, 72, 56, 51, 47, 44
- B** 66, 60, 53, 45, 36, 26
- C** 51, 44, 37, 30, 23, 16
- D** 43, 36, 29, 24, 19, 12

Key: C

Aligned CCLS: 4.OA.5

Commentary: This question is aligned to CCLS 4.OA.5 and assesses a student’s ability to generate a number pattern, based upon a given rule.

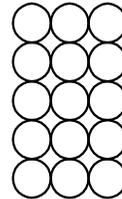
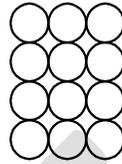
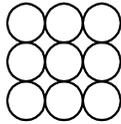
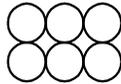
Rationale: The correct answer is Option C, because each successive term is created by the rule “subtract 7.” The pattern in Option C is “subtract 7,” or $51 - 44 = 7$, $44 - 37 = 7$, and so on. An answer of Option A or D would most likely indicate that the student did not test to see if the pattern explained how every term in the sequence was generated. Selecting Option B would most likely indicate a mistake in subtraction or application of the rule.

Domain: Operations and Algebraic Thinking

Item: MC

7

The first five terms in a shape pattern are shown below. The rule of the pattern is *the number of circles increases by three*. Which of the following would be true of the 6th term?



- A The number of circles in the 6th term would be a multiple of four.
- B The number of circles in the 6th term would be a prime number.
- C The number of circles in the 6th term would be an even number.
- D The number of circles in the 6th term would be divisible by five.

Key: C

Aligned CCLS: 4.OA.5

Commentary: This question is aligned with CCLS 4.OA.5 and assesses a student's ability to identify apparent features of the pattern that were not explicit in the rule itself.

Rationale: The correct answer is Option C, because the addition of three more circles to the fifteen in the 5th term will result in an even number, 18. Option A could indicate a misunderstanding of the concept of multiple. Option B could indicate a misunderstanding of the concept of prime number, or may indicate an inaccurate association between the value of three in the rule with three being a prime number. Option D may indicate an application of the claim in Option D on the fifth term rather than on the unrepresented sixth term.

Domain: Operations and Algebraic Thinking/Number and Operations—Fractions

Item: MC

8

A high school basketball team scored a total of 108 points in their final game. Joanne scored exactly $\frac{1}{3}$ of all the points the team scored, and Renee scored 23 points. How many points were scored by the rest of the team?

- A 36
- B 49
- C 59
- D 85

Key: B

Aligned CCLS: 4.OA.3, 4.NF.4c

Commentary: This question is aligned with CCLS 4.NF.4c and 4.OA.3. It assesses a student's ability to multiply a fraction by a whole number and to solve a multi-step word problem using addition and subtraction of whole numbers.

Rationale: The correct choice, Option B, is found by computing $\frac{1}{3} \times 108 = 36$, which is the number of points scored by Joanne. Since Renee scored 23 points, the total points scored by the two girls is $36 + 23 = 59$ points. Then $108 - 59 = 49$, the number of points scored by the rest of the team. If students miss the last step, they may select Option C. If they miss the last two steps, they may select Option A. If they simply subtract $108 - 23$, they will get Option D.

Domain: Operations and Algebraic Thinking

Item: MC

9

Jim baked sugar cookies and peanut butter cookies. He baked 8 sugar cookies and 3 times as many peanut butter cookies. What is the total number of cookies that Jim baked?

- A** 11
- B** 24
- C** 32
- D** 40

Key: C

Aligned CCLS: 4.OA.2

Commentary: This question is aligned to CCLS 4.OA.2 because it assesses a student's ability to multiply in order to solve a word problem that also includes a multiplicative comparison (3 times as many).

Rationale: Option C is the correct answer. Jim baked $3 \times 8 = 24$ peanut butter cookies, and since he also baked 8 sugar cookies, the total number of cookies baked is $24 + 8 = 32$. Selecting Option B as the correct answer indicates that the 8 sugar cookies were not added to the number of peanut butter cookies to get the total number of cookies. Option A indicates a simple addition ($8 + 3 = 11$) that does not incorporate the claim that there are 3 times as many peanut butter cookies as sugar cookies. Option D may indicate miscalculations throughout the process.

2012-13 NAEP Training

Grade 4 Mathematics Sample Items

Part 3: NAEP Sample Questions

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

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

Did you use the calculator on this question?

Yes No

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



A.



B.



C.



D.

Did you use the calculator on this question?

Yes No

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

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

Did you use the calculator on this question?

Yes No

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

Did you use the calculator on this question?

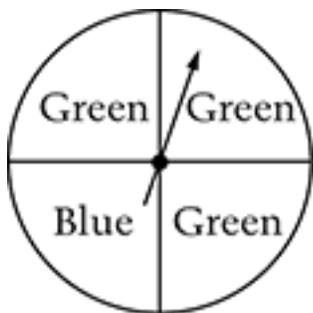
- Yes No

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

Answer: _____

Did you use the calculator on this question?

- Yes No



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

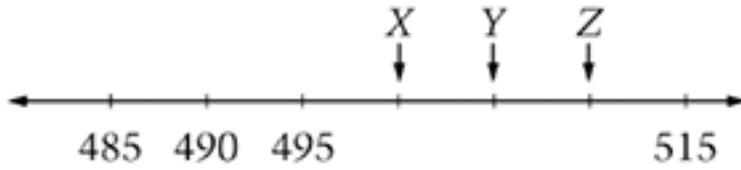
Did you use the calculator on this question?

- Yes No

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

Did you use the calculator on this question?

- Yes No

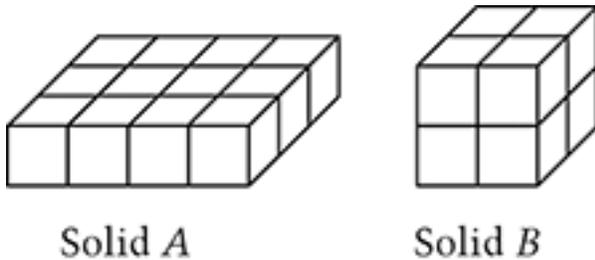


8. On the number line above, what is the sum of the numbers to which the arrows X, Y, and Z point?

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

Did you use the calculator on this question?

- Yes No



Solid A

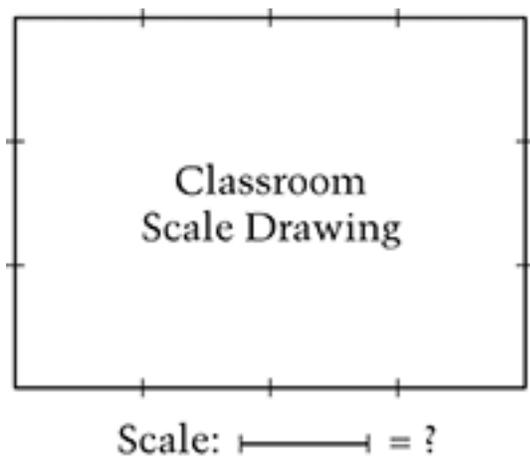
Solid B

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

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

Did you use the calculator on this question?

- Yes No



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

Did you use the calculator on this question?

- Yes No

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

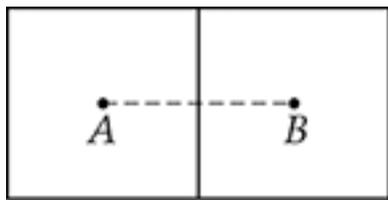
_____ pennies

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

_____ pennies

Did you use the calculator on this question?

- Yes No



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

Did you use the calculator on this question?

- Yes No

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

Did you use the calculator on this question?

Yes No

AMUSEMENT PARK

70 things to do!

34 rides
plus games
plus shows

14. 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.

Did you use the calculator on this question?

Yes No

4 quarts = 1 gallon

15. 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

Did you use the calculator on this question?

Yes No

16. 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 the calculator to solve this problem.

Did you use the calculator on this question?

Yes No

17. 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

Did you use the calculator on this question?

Yes No

MOVIE TIMES	
Early Show	3:15
Late Show	7:30

18. 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.

Did you use the calculator on this question?

- Yes No

19. 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.

Did you use the calculator on this question?

- Yes No