

Fourth Grade Math Strategies

We know the common core has introduced “new ways” of solving math problems. While the “old way” is still acceptable, we have to teach a variety of ways to solve computation problems. Once we have taught all the methods, unless a specific way of solving a problem is requested, the children are free to choose a method that they feel most comfortable with. We hope that tonight has been helpful.

Sincerely,

Mr. Dusharm and Mrs. Pacuk

Multiplication and Division: The key to solving multiplication and division problems consists of two very important things:

1. memorization of multiplication and division facts to 12
2. a firm knowledge of place value

If your child has mastered these two very important concepts, then multiplication and division will not be difficult.

Multiplication:

Method 1: Expanded Form:

$$\begin{aligned} 356 \times 7 &= (300 \times 7) + (50 \times 7) + (6 \times 7) = \\ &2,100 + 350 + 42 = \\ &2,492 \end{aligned}$$

$$\text{So } 356 \times 7 = 2,492$$

or

300	+ 50	+ 6
7	2,100	350
	42	

$$\begin{array}{r} 2,100 \\ 350 \\ + 42 \\ \hline 2,492 \end{array}$$

$$\text{So } 356 \times 7 = 2,492$$

Method 2: Partial Products

$$\begin{array}{r} 356 \\ \times 7 \\ \hline \end{array}$$
$$\begin{aligned} 42 &= 6 \times 7 \\ 350 &= 50 \times 7 \\ 2,100 &= 300 \times 7 \\ 2,492 & \end{aligned}$$

Method 3: Traditional :

$$\begin{array}{r} 34 \\ 356 \\ \times 7 \\ \hline 2,492 \end{array}$$

The key to solving multiplication problems this way is to break the numbers up into expanded form.

Look at the problem as

if it is written as $300+50+6$.

- 1. multiply 7ones times 6 ones*
- 2. multiply 7 ones times 5 tens*
- 3. Multiply 7 ones times 3 hundreds*
- 4. Add*

Method 1: Expanded Form:

$$\begin{aligned} 234 \times 51 &= (200 \times 50) + (200 \times 1) + (30 \times 50) + (30 \times 1) + (4 \times 50) + (4 \times 1) = \\ &10,000 + 200 + 1,500 + 30 + 200 + 4 \\ &11,934 \end{aligned}$$

So, $234 \times 51 = 11,934$

or

	200	+ 30	+ 4	
50	10,000	1,500	200	11,700
+1	200	30	4	<u>+ 234</u>
				11,934

So, $234 \times 51 = 11,934$

Method 2: Partial Products:

$\begin{array}{r} 234 \\ \times 51 \\ \hline \end{array}$	
$4 = 4 \times 1$	<i>Step 1: multiply 1 ones by 4 ones</i>
$30 = 30 \times 1$	<i>Step 2: multiply 1 ones by 3 tens</i>
$200 = 200 \times 1$	<i>Step 3: multiply 1 ones by 2 hundreds</i>
$200 = 4 \times 50$	<i>Step 4: multiply 5 tens by 4 ones</i>
$1,500 = 30 \times 50$	<i>Step 5: multiply 5 tens by 3 tens</i>
$\underline{10,000} = 200 \times 50$	<i>Step 6: multiply 5 tens by 2 hundreds</i>
$11,934$	

Method 3: Traditional:

$$\begin{array}{r} 12 \\ 234 \\ \times 51 \\ \hline 234 \\ 11,700 \\ \hline 11,934 \end{array}$$

Division

Method 1: Repeated Subtraction:

$$72 \div 6 =$$

$$72$$

$$\underline{- 6}$$

$$66$$

$$\underline{- 6}$$

$$60$$

$$\underline{- 6}$$

$$54$$

$$\underline{- 6}$$

$$48$$

$$\underline{- 6}$$

$$42$$

$$\underline{- 6}$$

$$36$$

$$\underline{- 6}$$

$$30$$

$$\underline{- 6}$$

$$24$$

$$\underline{- 6}$$

$$18$$

$$\underline{- 6}$$

$$12$$

$$\underline{- 6}$$

$$6$$

$$\underline{- 6}$$

$$0$$

Count up the times you subtracted 6, which is 12, so the answer is 12.

$$\text{So, } 72 \div 6 = 12$$

Method 2: Partial Quotients

$$\begin{array}{r} 25 \\ 5 \overline{) 125} \end{array}$$

Decide which multiples to use

$$- \underline{100} = \underline{20} \times 5$$

Step 1: multiply 20 x 5

$$25$$

Step 2: subtract

$$- \underline{25} = \underline{5} \times 5$$

Step 3: multiply 5x5

$$0$$

Step 4: subtract

$$20 + 5 = 25$$

Step 5: add up the numbers that are underlined

This can be done with any multiples of 5

$$\begin{array}{r} 25 \\ 5 \overline{) 125} \end{array}$$

$$- \underline{50} = \underline{10} \times 5$$

$$75$$

$$- \underline{50} = \underline{10} \times 5$$

$$25$$

$$- \underline{25} = \underline{5} \times 5$$

$$0$$

$$10 + 10 + 5 = 25$$

or

$$125 \div 5 =$$

$$100 + 20 + 5$$

$$5 \begin{array}{|c|c|c|} \hline 20 & 4 & 1 \\ \hline \end{array}$$

$$20 + 4 + 1 = 25$$

$$\text{So, } 125 \div 5 = 25$$

Method 3: Traditional:

$$\begin{array}{r} 25 \\ 5 \overline{) 125} \\ \underline{- 10} \\ 25 \\ \underline{- 25} \\ 0 \end{array}$$

Released NYS test questions in ELA and Math

<https://www.engageny.org/resource/new-york-state-common-core-sample-questions>

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

Answer _____

Measured CCLS: 4.NF.2

Commentary: This question measures 4.NF.2 because it assesses a student's ability to compare fractions with different numerators and denominators.

Extended Rationale: This question asks the student to determine which of three students ran the shortest distance, given fractions of a mile. The student must include a set of computations or visual models to explain and justify each step in the process. As indicated in the rubric, student responses will be rated on whether they show sufficient work to indicate a thorough understanding of comparing fractions with different numerators and denominators. The determining factor in demonstrating a thorough understanding is using mathematically sound procedures to lead to a correct response.

The correct answer is Leah.

Method 1: Student finds a common denominator for 6, 3, and 4, then compares the fractions by comparing numerators.

$$\frac{5}{6} = \frac{10}{12}$$

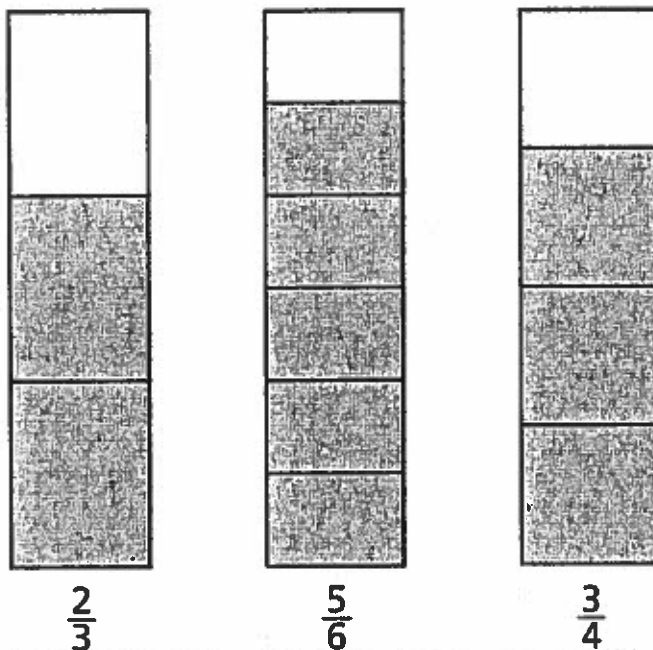
$$\frac{2}{3} = \frac{8}{12}$$

$$\frac{3}{4} = \frac{9}{12}$$

The least fraction is $\frac{8}{12}$, which is the distance, in miles, Leah ran.

Method 2: Student may draw models showing equal-sized rectangles shaded to represent each fraction.

Student will show that a rectangle with $\frac{2}{3}$ of the parts shaded is less than both a rectangle with $\frac{5}{6}$ shaded or $\frac{3}{4}$ shaded.



Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Leah

Show your work.

$$\begin{array}{l} \frac{5}{6} \quad \frac{2}{3} \quad \frac{3}{4} \\ 6: 6, \textcircled{12}, 18, 24, 30, 36 \\ 3: 3, 6, 9, \textcircled{12} \\ 4: 4, 8, \textcircled{12}, 16 \end{array} \quad \begin{array}{l} \frac{5 \times 2}{6 \times 2} = \frac{10}{12} \quad \frac{2 \times 4}{3 \times 4} = \frac{\textcircled{8}}{12} \quad \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \\ \text{Shortest} \\ \text{distance} \end{array} \quad \begin{array}{l} 12 = \text{common} \\ \text{denominator} \end{array}$$

Answer Leah

Score Point 2 (out of 2 points)

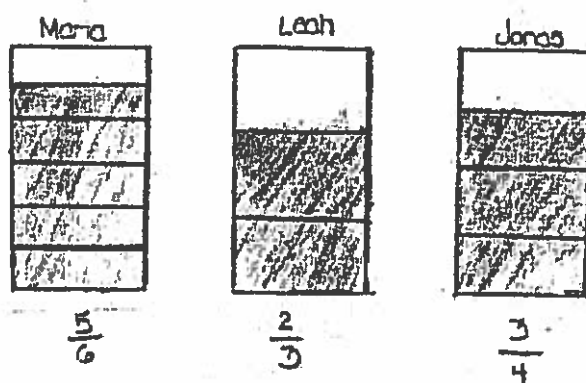
This response includes the correct solution (Leah) and demonstrates a thorough understanding of the mathematical concepts in the task. The shortest distance is determined by correctly converting the three fractions to equivalent fractions ($\frac{10}{12}$, $\frac{8}{12}$, $\frac{9}{12}$) with the least common denominator (12).

Marla, Leah, and Jonas ran these distances on Saturday:

- Marla ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.



Answer Leah

Score Point 2 (out of 2 points)

This response includes the correct solution and demonstrates a thorough understanding of the mathematical concepts in the task. The three fractions are correctly represented by comparable tape diagrams visually showing $\frac{2}{3}$ as the smallest.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

$$\frac{5}{6} \quad \frac{3}{4} \quad \frac{3}{3}$$



Answer ~~Leah~~ Maria

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response contains an incorrect solution (Maria) but applies a mathematically appropriate process. The three fractions are correctly represented as pie charts for comparison. However, the incorrect solution is the result of comparing the unshaded rather than the shaded parts of each chart, thereby identifying the longest distance instead of the shortest.

Maria, Leah, and Jonas ran these distances on Saturday:

- Maria ran $\frac{5}{6}$ mile. = $\frac{10}{12}$
- Leah ran $\frac{2}{3}$ mile. $\frac{8}{12}$
- Jonas ran $\frac{3}{4}$ mile. $\frac{9}{12}$

Who ran the shortest distance?

Show your work.

$$\text{Maria } \frac{5}{6} \times 2 = \frac{10}{12}$$

$$\text{Leah } \frac{2}{3} \times 4 = \frac{8}{12} \leftarrow \text{Shortest Distance}$$

$$\text{Jonas } \frac{3}{4} \times 3 = \frac{9}{12}$$

Leah
ran the shortest
distance

Answer Leah ran the
Shortest distance

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The three fractions are appropriately converted to equivalent fractions using the least common denominator (12) and the response contains a correct solution (Leah). However, instead of showing multiplication by 1, $\frac{2}{3}$ for example, the work incorrectly shows multiplication by a whole number other than 1 ($\frac{5}{6} \times 2 = \frac{10}{12}$, $\frac{2}{3} \times 4 = \frac{8}{12}$, $\frac{3}{4} \times 3 = \frac{9}{12}$).

Marla, Leah, and Jonas ran these distances on Saturday:

- Marla ran $\frac{5}{6}$ mile.
- Leah ran $\frac{2}{3}$ mile.
- Jonas ran $\frac{3}{4}$ mile.

Who ran the shortest distance?

Show your work.

Leah ran $\frac{2}{3}$ mile
She ran shortest
distance

Answer _____

Score Point 0 (out of 2 points)

This response does not demonstrate even a limited understanding of the mathematical concepts embodied in the task. The response includes the correct solution; however, the required work is missing.

The Cave of the Oilbird
By Shulamith Levey Oppenheim

1. I'm nine years old today, and Manuelo has a surprise for me. "Happy birthday, Carla," he calls when he sees me. "I am going to take you into the rain forest today! Deeper and farther than you have ever been, because I want you to discover the cave of the oilbirds. That's my present to you." He puts a flashlight and mosquito repellent into his back pocket. "We'll need these," he explains. I can tell from his voice, he's excited. I'm excited, too.

2 I have a question. "Manuelo, you've been to the cave, and many other people have been to the cave. How can I discover something that has already been discovered?"

3 My brother squats down beside me when we talk, because he is very tall. "Every time someone sees something for the first time," he answers quietly, "it is a discovery." I think Manuelo is very wise.

4 We start down the path that leads away from our house into the forest. The sun is shooting golden arrows through the canopy of thick leathery leaves. Some of them are shaped like canoe paddles. Manuelo and I walk slowly. I love my rain forest. The earth is moist and red, and there is no grass or shrubs. The bulging roots prop up ancient trees with names like milk and monkey pot and incense.

5 "When will we get to the cave?" I look up at Manuelo.

6 "Wait." Manuelo puts a finger to his lips. I think I know what he means. In the rain forest you really should not speak. You look and you listen.

7 We have been walking for a very long time. The path is dropping sharply now. I hear water gurgling. I want to race ahead, but I don't. Manuelo peers through the trees. He walks a short distance into the forest, then comes back to the path. He once told me that if you hurry in the rain forest, you could miss something very interesting and very beautiful. And he's right.

8 Suddenly we are standing in front of a rock cliff with shallow water bubbling over brown and yellow stones. In the cliff is a dark opening. The bellbird clangs out. My heart is pounding, and I hold Manuelo's hand tightly as we step from one slippery stone to another, till we are close to the mouth of the cave.

9 Manuelo turns on his flashlight and runs the light along the cave walls. At first I don't see anything except sharp rocks sticking out from the sides of

the cave. I open my eyes as wide as I can, till I feel wrinkles in my forehead. I peer and peer. Then! I see two red dots appear—two more and two more. And then! Around those red dots faces begin to shape. Faces with stiff whiskers pointing downward on each side of hooked beaks. The faces are still as stones, not moving even one bit, and the eyes are staring without a blink.

10 “The oilbirds!” My brother mouths the words. He has the same look on his face as the time when the motmot bird perched in the immortelle tree outside our house. Manuelo still moves the light up and down the walls, and I can see another pair of eyes and then another and another. And more and more heads appear around the eyes—serious heads with whiskers and hooked beaks—silent and still like statues. There must be hundreds! I feel goose bumps rising all over me. Are the oilbirds staring at me? I shiver, and Manuelo pulls me close to him. There isn’t a sound except the water gurgling over the stones.

11 I don’t know how long we stand in the cave of the oilbirds—but it must be a very long time. When Manuelo turns off his flashlight, we start back across the stones and up the path.

12 “Did you like the oilbirds, Carla? What have you been thinking?” Manuelo asks me.

13 I don’t answer right away. But I have been thinking.

14 “Oh, Manuelo, that was the best birthday present ever,” I whisper. “Will you take me here again, please, please?”

15 He smiles. “Of course I will. There are very few oilbirds left in the world. We must protect them so that other children can discover them.”

16 My brother is very wise. I don’t think I will make another discovery as special as this one for a long, long time.

ELA Question from NYS ELA 2014 Test

Why is the setting of “The Cave of the Oilbird” important? Use **two** details from 30 the story to support your response.

MEASURES CCLS: RL.4.3:

Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).

HOW THIS QUESTION MEASURES RL.4.3:

This question measures RL.4.3 because it asks students to determine why the setting is important to the story. This conclusion requires students to describe the setting based on details found in the text.

CHARACTERISTICS OF RESPONSES RECEIVING FULL CREDIT:

A response receiving full credit will use textual details to conclude that the setting is important because the plot events, themes, and characters' reactions are all based on aspects of the setting. While Carla and Manuelo walk through the rainforest, Carla is reminded why she loves it. She also thinks of a couple important lessons she has learned from her brother: "You look and you listen," and slow down so you don't "miss something very interesting and beautiful." The cave setting is important because it allows Carla to discover "something for the first time," and it was "the best birthday present ever." Seeing the oilbirds in person allows Carla to understand why Manuelo says, "We must protect them so that other children can discover them."

Multiple details from the description of the rainforest and the cave may be cited as support for students' answers.

There is no single "correct" response, but rather responses that are defensible based on the Short-Response (2-point) Holistic Rubric and responses that are not. Student responses are evaluated on the relevance, accuracy, and sufficiency of conclusions, inferences, and supporting details. Responses should be organized in a logical manner and composed in complete sentences. Any errors should not impact readability.

HOW TO HELP STUDENTS MASTER STANDARD RL.4.3:

To help students succeed with questions assessing standard RL.4.3, instruction could focus on teaching students how the setting of a story affects the characters, themes, and plot developments. Students could practice identifying the setting of stories, evaluating the impact it has on the characters, themes, and plot, and finding details that support their conclusions.

See Short-Response (2-point) Holistic Rubric, suggested sample student responses and scoring: two 2-pt responses, two 1-pt responses, one 0-pt response.

NYS would like each child's answer to have a claim and at least 2 details to support the claim.

2 point answer

claim

The Setting of "The Cave of the Oilbird" is important because the oilbirds live in that cave and Carl got to discover oilbirds. The setting is also important because I learned that the oilbirds are endangered and that cave is there habitat so if someone ruins the cave^{all} the oilbirds can no longer be in the world.

details

Score Point 2 (out of 2 points)

This response makes valid inferences from the text to explain the importance of the setting of "The Cave of the Oilbird" (because the oilbirds live in that cave and Carl got to discover oilbirds). The response provides a sufficient number of concrete details from the text for support as required by the prompt (oilbirds are endangered and that cave is their habitat). This response includes complete sentences whose errors do not impact readability.

claim

The setting of "The Cave of the Oilbird" is important because it explains the amount of birds that live in the habitat. For example, it says, "Then more heads appear around the eyes!" Another example is when Carter thinks to himself, "There must be hundreds of them staring at me!"

details

Score Point 2 (out of 2 points)

This response makes a valid inference from the text to explain the importance of the setting of "The Cave of the Oilbird" (it explains the amount of birds that live in the habitat). The response provides a sufficient number of concrete details from the text for support as required by the prompt (*Then more heads appear around the eyes* and *There must be hundreds of them staring at me*). This response includes complete sentences where errors do not impact readability.

1 point answer:

A reason the setting "The Cave of the Oilbird" is so important is because the words that Manuelo said, ("If you hurry in the rain forest, you could miss something very interesting and very beautiful.") make sense. One other reason is because you could get lost in the rain forest very easily.

details

Score Point 1 (out of 2 points)

This response is a mostly literal recounting of details from the text (*if you hurry in the rain forest, you could miss something very interesting and very beautiful*). While the response includes some information from the text, no valid inference and/or claim is present.

claim

The setting of "The Cave of the Oilbird" is important because the author wanted us to see a picture in our mind while informing us the Oilbird is almost extinct.

Score Point 1 (out of 2 points)

This response makes a valid inference from the text to explain the importance of the setting of "The Cave of the Oilbird" (because the author wanted us to see a picture in our mind while informing us the Oilbird is almost extinct); however, the response does not provide two details from the text for support as required by the prompt.

0 point answer:

This answer does not have a claim and or text based details to support the claim.

Because you won't know the setting and it will be boring.

Score Point 0 (out of 2 points)

This response does not address any of the requirements of the prompt (Because you won't know the setting and it will be boring).