



**THIRD SPACE
LEARNING**

Math Intervention Pack

Expressions involving
parentheses

Grade 5

How To Use This Resource

1. Title Slide

Use this slide to activate prior knowledge needed for lesson. Students should be encouraged to initially attempt the question presented independently.

2. Let's Learn

Use this slide to introduce the concept. Tutors should work with the student to explore the concept together, usually using diagrams to support understanding.

3. Follow Me + Your Turn

The tutor should work through the follow me slide, modeling the process and explaining their thinking out loud.

Students should use the your turn slide as an opportunity to work through a question similar to the follow me questions. They should apply the method modeled by the tutor in the follow me slide. Students should be encouraged to explain their thinking out loud.

4. You Do

Students should work through a range of questions that build in complexity.

Tutors can offer support but students should initially be encouraged to attempt these questions independently.

5. Go Further

Use this slide to allow students to apply their understanding to a more challenging question in an unfamiliar context.

6. Support for Slides

The support slide is used to support students during the lesson. In the tutor notes, there will be guidance as to when to use the support slide.

7. Check Your Understanding

Tutors should use this slide to assess the student's knowledge and whether or not they have mastered the concept within the lesson.

Standard

5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Key Mathematical Ideas

1. To understand the use of parentheses in expressions.
2. To use the order of operations to solve expressions.

Overview

Terminology

- **Sum:** The result when two or more numbers are added
- **Difference:** The result when two numbers are subtracted; the missing addend
- **Product:** The result when two or more numbers are multiplied
- **Quotient:** The result when two numbers are divided; the missing factor
- **Equation:** A mathematical sentence in which one part is the same or equal to the other part
- **Expression:** One or more mathematical symbols that represent a number or quantity

Sentence Stems

- The first step of this problem would be to solve

Overview

Common Misconceptions

Common Misconceptions	Tutoring Strategies	Checks for Understanding
Students ignoring the parentheses.	This misconception isn't very common but this would be the main reason students get the wrong answer for problems like the ones in this lesson. Emphasize that this is done before anything else, and is in fact the tool used by mathematicians to help others know when certain parts need to be solved before others, if it goes against the regular order.	<ul style="list-style-type: none">• What do the parentheses indicate?• Why are the parentheses so important?
Students rewriting expressions incorrectly in between steps.	<p>Oftentimes, students will solve part of an expression but include a number or operation they've already used in the next step. For instance, solving $3 \times 5 + 7$, they might solve 3×5 (15) but then write the next step as $15 + 5 + 7$ rewriting the 5 that was already used in the first step.</p> <p>Even if you do not see a student doing this, you may want to make them aware of this common mistake so that they are mindful of it with these simpler problems, because it will become more common as they work on more complex expressions in the future.</p>	<ul style="list-style-type: none">• Now that I've used these numbers, how do I write the next step?

Title Slide

If stuck

- Have students try to solve this problem on their own to see if they get a different answer. If they get the same answer, you can ask them what they think the parentheses mean in the expression. (The error here is that the parentheses were ignored and it was solved as $2 \times 4 + 3$) If they get a different answer, the correct answer (14) then you can ask the student if they can figure out how someone would have arrived at the answer 11.

Answers

- Answers may vary. The student multiplied 2×4 first, then added their answer to 3, solving the equation from left to right. However, they needed to solve the addition inside the parentheses first, then multiply their answer by 2.

Let's Learn

If stuck

- Go through the pyramid on the right to see the order of the steps taken in the order of operations. Explain the “from left to right” portion of the multiplication and division, and addition and subtraction sections by letting the student know that multiplication doesn’t necessarily come before division everytime, it is always done in the order it appears when reading the expression from left to right.
- Looking at the expression, note that we have parentheses, so we go through step 1.
- Then we go through the rest of the pyramid, skipping over parts that are not present in this particular expression.
- One common mistake in the order of operations that will most likely be avoided on this slide, is students rewriting the expression incorrectly after solving one of the steps. The space for this is given, so really emphasize the importance of this step to students as you rewrite the expression in step 2.

Questions

- What parts of the pyramid do you notice are in this expression?
- Going by the pyramid, what would we have to solve first in this expression?
- What would we have to solve second?

Watch out for

- Students ignoring the parentheses in the expression.

Answers

- 10
- $31 + 10 = 41$
- $31 + (2 \times 5) = 41$

Follow Me

Modeling prompts

- The Support Slide breaks down the steps of this problem in a similar way to the Let's learn slide if the student is struggling with it here.
- Reference the pyramid on this slide to help students remember the order.
- You can let the student know that it does not matter which parentheses we solve first, but the placement of the answers needs to be in the same order since we will be dividing them. "We need to solve $12 + 23$ and $14 - 9$ before we can divide, because we are dividing the answers to these problems.
- Go through parts a and b, and show how that comes together in part c and how the first set of parentheses is still first in the equations, and the second set is still second.
- This is a really good opportunity to show that going out of order would make this expression much more difficult to solve—this can be a chance for them to check themselves as they go and notice that they might be doing something wrong, if they find themselves having to solve something they can't easily do mentally. Everything they are being asked to solve on these slides should be capable of being done mentally.

Answers

- a. 35
- b. 5
- c. $35 \div 5 = 7$

Your Turn

If stuck

- The Support Slide breaks down the steps of the problem on the Follow me part of this slide and can be used if the student is struggling on this one.
- Reference the pyramid on this slide to help students remember the order.
- You can let the student know that it does not matter which parentheses we solve first, but the placement of the answers needs to be in the same order since we will be dividing them. “We need to solve $12 + 23$ and $14 - 9$ before we can divide, because we are dividing the answers to these problems.
- Go through parts a and b, and show how that comes together in part c and how the first set of parentheses is still first in the equations, and the second set is still second.

Questions

- What parts of the pyramid do you notice are in this expression?
- Going by the pyramid, what would we have to solve first in this expression?
- What would we have to solve second?
- What would we have to solve last?

Watch out for

- Students ignoring the parentheses in the expression.
- Students rewriting the problem in the wrong order or with numbers that have already been used.
- Students operating with a number more than once.

Answers

- a. 20
- b. 20
- c. $20 \div 20 = 1$

You Do

If stuck

- Reference the PEMDAS pyramid on another slide or write the letters on the top of this slide if the student needs the reminder.
- Make sure students are rewriting expressions correctly as they go along and not forgetting that they already used certain numbers/completed certain operations already.
- Use part e to discuss why those expressions are different even though they have the exact same numbers and operations.

Questions

- What parts of PEMDAS are in this expression?
- Now that I've solved the first step, what do I need to solve for my second?
- If these two expressions have all the same number and operations, how did we get different answers?

Watch out for

- Students ignoring the parentheses in the expression.
- Students rewriting the problem in the wrong order or with numbers that have already been used.
- Students operating with a number more than once.

Answers

- a. $24 - 13 = 11$
- b. $5 \times 9 = 45$
- c. $60 - 3 = 57$
- d. $43 - 35 = 6$
- e. No, you had to solve them in a different order!

Go Further

If stuck

- This is where students will have to do the order of operations in reverse to solve for the missing number. First ask the student, “If we are multiplying 3 to the sum of what’s inside the parentheses, we need to think, ‘what times 3 is 33?’” (11)
Once you have 11, you can then ask, “What plus 4 is 11?” (7)

Questions

- What times 3 is 33?
- What plus 4 is 11?

Watch out for

- Students ignoring the parentheses in the expression.
- Students not knowing the inverse of multiplication facts.

Answers

- $3 \times (4 + 7) = 33$
 $33 \div 3 = 11$
 $11 - 4 = 7$

Support for Slide(s)

This slide supports the Follow Me slide.

If stuck

- Use the pyramid on this slide to go through the steps of this problem together.

Questions

- What parts of the pyramid do you notice are in this expression?
- Going by the pyramid, what would we have to solve first in this expression?
- What would we have to solve second?
- What would we need to do last?

Check Your Understanding

Correct answers

- b. 76
- a. Students may choose a if they multiplied 6×4 first and then subtracted the product from 25.
- b. B is the correct answer. The student should start with subtracting the expression inside the parentheses, $25 - 6$ to get 19, then multiply 19 to 4 to get 76.
- c. Students may choose c if they do the order of operations correctly but do the computation incorrectly.
- d. Students may choose d if they do the order of operations correctly but subtracted incorrectly and got 21 as the difference and then multiplied that to 4.




Today you will learn about

Expressions involving parentheses



Warm-up question

Explain why this answer is incorrect.

$$2 \times (4 + 3) = 11$$


Let's learn

PEMDAS helps us remember the order to complete an expression when there are different operations.
We follow the order down the triangle.

Let's look at this expression.

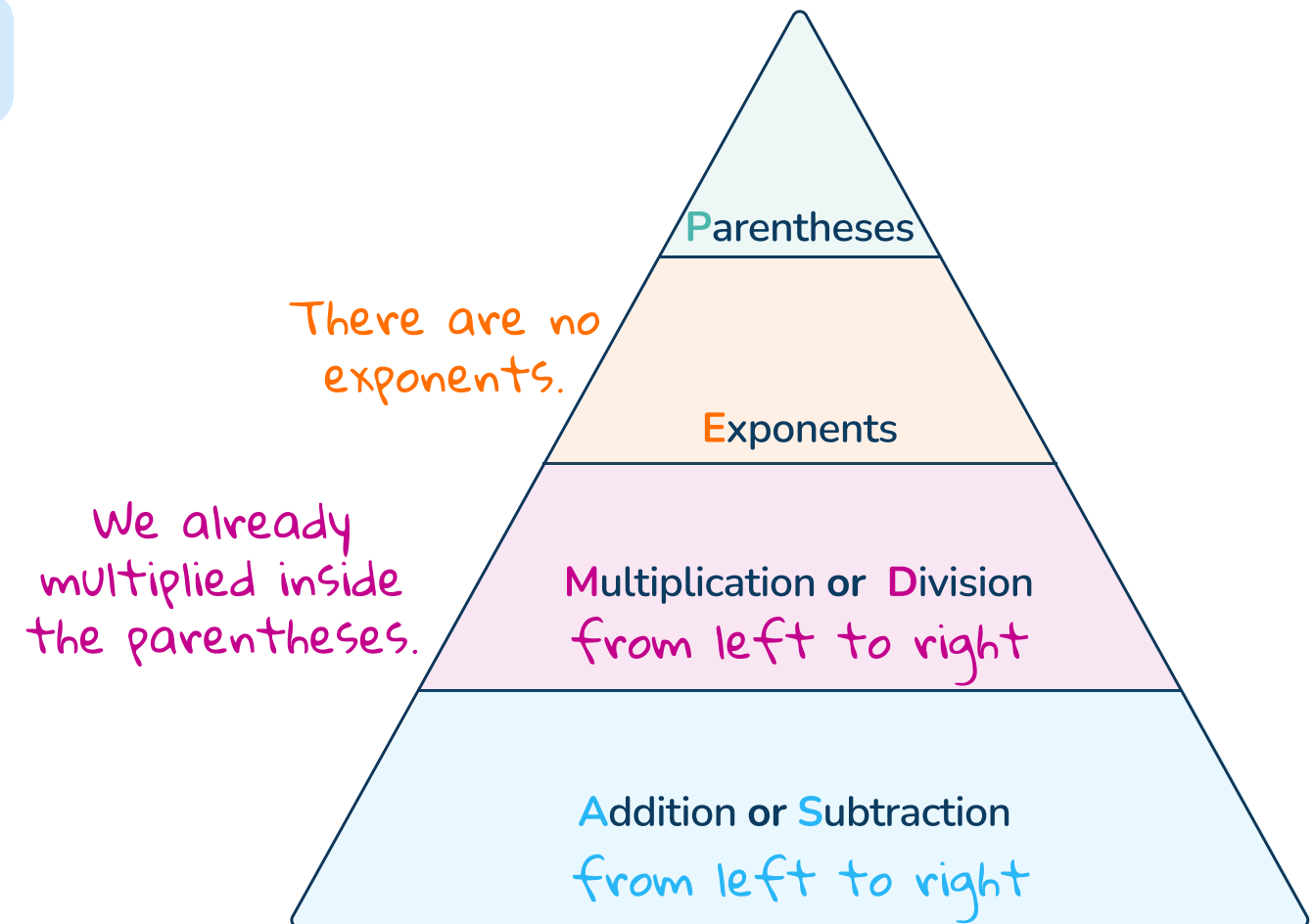
$$31 + (2 \times 5)$$

Step 1: P - There are **parentheses**, so we complete this part first.

$$31 + \underbrace{(2 \times 5)}_{\text{.....}}$$

Step 2: A or S - There is **addition**, so we complete this next.

$$31 + \text{.....} = \text{.....}$$



$$31 + (2 \times 5) = \text{.....}$$



Follow me



- 1 Let's look at this expression.
- (12 + 23) ÷ (14 – 9)
- a First, complete the first part of the expression in parentheses.

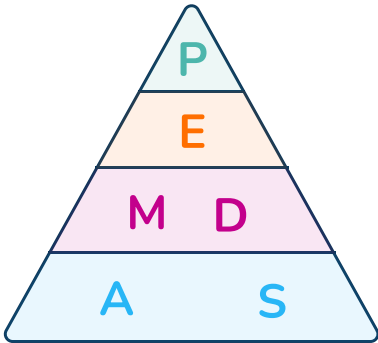
12 + 23 =
.....

- b Next, complete the next part of the expression in parentheses.

14 – 9 =
.....

- c Complete the equation.

..... ÷ =
.....



Your turn



- 1 Now try this expression.
- (35 – 15) ÷ (14 + 6)
- a First, complete the first part of the expression in parentheses.

35 – 15 =
.....

- b Next, complete the next part of the expression in parentheses.

14 + 6 =
.....

- c Complete the equation.

..... ÷ =
.....

1 Solve these expressions.

a $(45 - 21) - 13$

b $5 \times (12 - 3)$

c $(5 \times 12) - 3$

d $43 - (14 + 21)$

e Did you get the same answer for part b and c? Explain.

Which number is missing from this equation?

$$3 \times (4 + \text{.....}) = 33$$

Let's look at this expression. $(12 + 23) \div (14 - 9)$

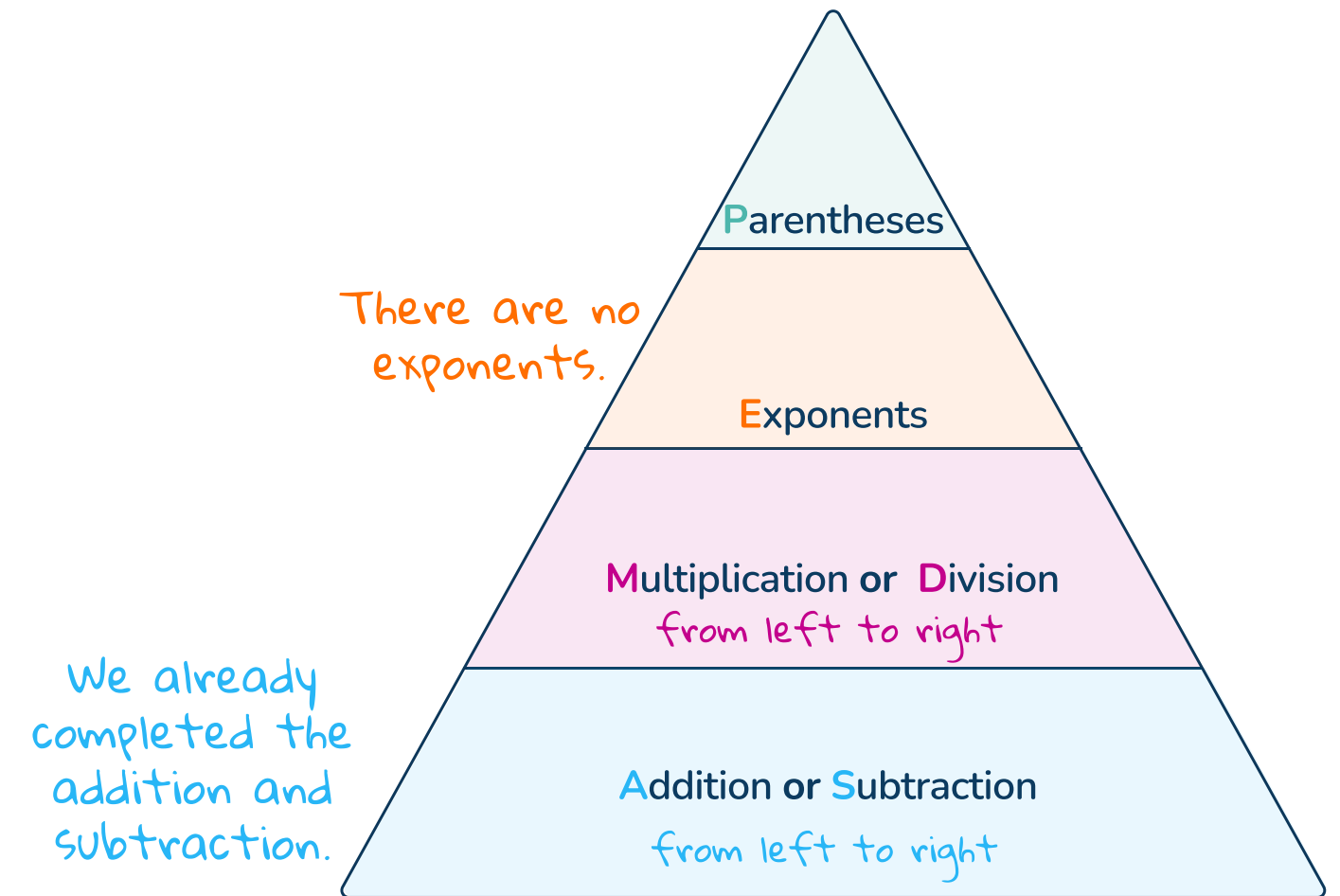
Step 1: **P** - There are **parentheses**, so we complete this part first.

$$\underbrace{(12 + 23)}_{35} \div \underbrace{(14 - 9)}_5$$

Step 2: **D** - There is **division**, so we complete this part next.

$$\underbrace{35 \div 5}_7$$

$$(12+23) \div (14 - 9) = 7$$



The answer is 7

Check your understanding

Find the answer to the following expression:
 $(25 - 6) \times 4$

a

1

b

76

c

72

d

84




Why do I need to try this question on my own first?

- To show your tutor what you understand
- To give you more practice
- To show your teacher how you are doing



Do you have a group of students who need a boost in math?

Each student could receive personalized lessons every week from our specialist one-on-one math tutors.




-  Differentiated instruction for each student
-  Aligned to your state's standards
-  Scaffolded learning to close gaps

“We just had our first session and it went great! The kids really liked it and felt like they were learning! One even said he finally felt like math was making sense.”



Michelle Craig, Instructional Coach,
Sherwood Forest Elementary, Washington

Speak to us

-  thirdspacelearning.com/us/
-  (929) 298-4593
-  hello@thirdspacelearning.com



THIRD SPACE
LEARNING