3rd Grade ADV-Level Math

Unit 3: Relating multiplication to division

Dear Families,

We want to make sure that you understand the mathematics your child will be learning this year. Below you will find the standards we will be learning in Unit 3.

Each standard is in bold print and below each one is an explanation with student examples. Please let your teacher know if you have any questions. We appreciate your partnership and support.

3.PAR.3.2: Represent single digit multiplication and division facts using a variety of strategies. Explain the relationship between multiplication and division.

Students are responsible for solving multiplication problems including single-digit factors and division problems including single-digit divisors and quotients. Students may use a variety of strategies such as repeated addition, arrays, area models, number line, and skip counting.

Example:

1. Bobby has 30 building blocks that are six different colors. He splits them into groups by color. Which equation shows how many blocks are in each group? Pick all that are correct.
    A. 30 + 6 =
    B. 30 – 6 =
    C. 30 x 6 =
    D. 30 ÷ 6 =
    E. 6 x __ = 30
    F. 6 ÷ __ = 30

Answers:

1. D & E

3.PAR.3.3: Apply properties of operations (i.e., commutative property, associative property, distributive property) to multiply and divide within 100.

Students are responsible for understanding the various properties and using them in multiplication and division problems.

Examples:

- 7 x 3 is known, then 3 x 7 is also know (Commutative property)
- 3 x 5 x 2 can be found by 3 x 5 = 15 x 2= 30 OR 5 x 2 = 10 x 3 = 30 (Associate property)
- Knowing 8 x 5 = 40 and 8 x 2 = 16

- 8 x 7 can be found as the sum of these partial products: 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 (Distributive property)

3.PAR.3.4: Use the meaning of the equal sign to determine whether expressions involving addition, subtraction, and multiplication are equivalent.

Students can use various strategies to solve each side of an expression to determine if it is equal.

Example:

1. Ten teams of 8 students signed up for a volleyball tournament. One of the teams had to drop out. Write an equation with two expressions that show how many students will be at the tournament.

Possible Answers:

A. 9 groups of 8 is the same as 10 groups of 8 minus one group of 8, 9 x 8 = (10 x 8) – 8
B. 9 x 8 = 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8

3.PAR.3.5: Use place value reasoning and properties of operations to multiply one-digit whole numbers by multiples of 10, in the range 10-90.

Students are responsible for using multiples of 10 to solve one-digit multiplication problems.

Example:

1. Anna has 4 pages of stickers. Each page has 50 stickers. How many stickers does Anna have all together?

Answer:

A. 200 stickers (ways students could solve below)
    a. 4 x 50 = 200 because 4 groups of 50 is 200
    b. 4 x 50 = 4 x (10 x 5) = (4 x 10) X 5 = 40 X 5 = 200

3.PAR.3.6: Solve practical, relevant problems involving multiplication and division within 100 using part-whole strategies, visual representations, and/or concrete models.

Students are expected to solve multiplication and division problems within 100 which means multiplication and division of two whole numbers with whole number answers, and with product or dividend in the range of 0-100 (ex. 39 ÷ 3 = 13).

Examples:

1. The store had video games on sale for $15 each. If you bought 4 games, how much would you spend?
    a. Possible ways students could solve the problem below

2. Peter has 6 bags of oranges. He has 6 × 9 oranges altogether. What could the 9 mean?
    a. He bought 9 more bags of oranges.
    b. He already ate 9 of the oranges.
    c. There are 9 oranges in each of the bags.
    d. There are 9 people who want oranges.

Answers:

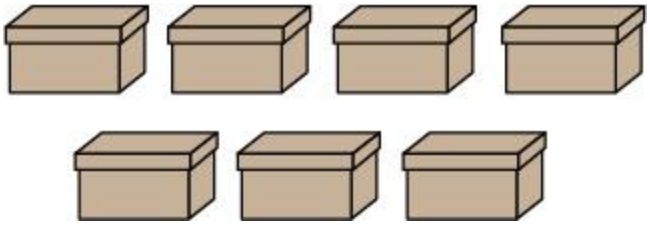
1. 15 x 4 = 60 OR 4 x (10 + 5) = 4 x 10 = 40, 4 x 5 = 20, 40 + 20 = 60
2. A. there are 9 oranges in each of the bags

3.PAR.3.7: Use multiplication and division to solve problems involving whole numbers to 100. Represent these problems using equations with a letter standing for the unknown quantity. Justify solutions.

Students should use a variety of strategies to solve multi-step authentic, mathematical problems and should represent problems using equations with a variable standing for the unknown quantity and justify their answers. Variables can be letters used to represent the unknown.

Example:

1. Kylie helped her grandfather clean out his basement. He paid her $3 for each box she filled up. Kylie filled 7 boxes.



She put the money she earned into her piggy bank and then counted how much was in the piggy bank. She had $66 total.

Which equation can be solved to find how much money was in Kylie's piggy bank before her grandfather paid her (*n*)?

A. $66 + 3 \times 7 = n$

B. $n + 3 + 7 = 66$

C. $n + 3 \times 7 = 66$

D. $n \times 3 \times 7 = 66$

Answer:

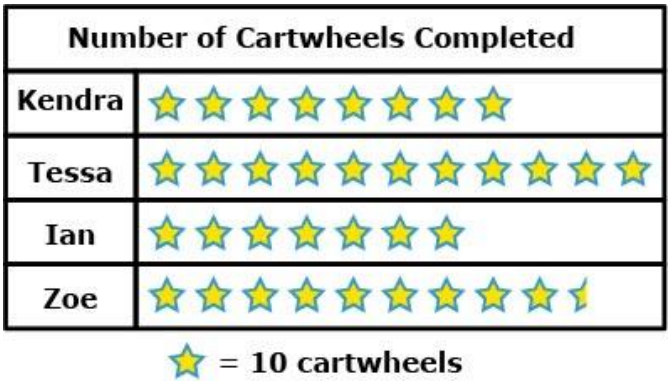
1. C

3.MDR.5.1: Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life.

Students are expected to solve relevant problems which can include word problems that are meaningful to a student's real environment. It is important for the problems presented to be relevant and interesting for the learners to pique their natural, intellectual curiosity. Questions should be student generated.

Example:

1. In Mr. Jones's PE class, the students did as many cartwheels as they could in five minutes. They represented their results in a picture graph. Use the graph below to answer the question.



How many more cartwheels did Kendra and Tessa complete than Ian and Zoe?

a. 3
b. 25
c. 165
d. 190

Answer:

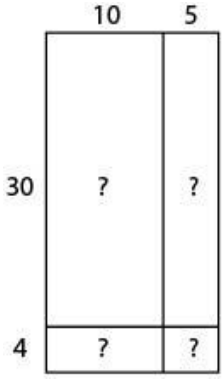
1. B

4.NR.2.3: Solve relevant problems involving multiplication of a number with up to four digits by a 1-digit whole number or involving multiplication of two two-digit numbers using strategies based on place value and the properties or operations. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.

Students should be able to solve problems involving the multiplication of a number with up to four digits by a 1-digit whole number. Students should be able to illustrate and explain their calculations using various strategies.

Example:

1. Aaron had 15 sticker sheets with 34 stickers on each sheet. Aaron used the area model below to help him solve for.



   Which values are the correct products that can replace each ? in the model so that Aaron can find the total number of stickers? Select the four that are correct.
   a. 20
   b. 30
   c. 40
   d. 150
   e. 300
   f. 400

Answer:

1. A, C, D, & E

4.NR.2.4: Solve authentic division problems involving up to 4-digit dividends and 1-digit divisors (including whole number quotients with remainders) using strategies based on place-value understanding, properties of operations, and the relationships between operations.

Students should be able to solve division problems involving up to 4-digit dividends and a 1-digit division. Students should be able to illustrate and explain their calculations using various strategies.

Example:

1. Antonio won a jar of 373 jellybeans in a school contest. He wants to share them. He and his 7 friends will share them. How many jellybeans will each of the friends get?

Answer:

1. Possible solution:
   a. 373 ÷ 8 = (320 ÷ 8) + (40 ÷ 8) + (13 ÷ 8) = 46 with 5 jellybeans left over.

i. (320 ÷ 8) = 40
ii. (40 ÷ 8) = 5
iii. (13 ÷ 8) = 1
iv. 5 left over as remainder