

Lesson 13-4

Monday, April 13, 2020 11:02 AM

Name _____



Solve & Share

Mrs. Katz is planning her family's trip to the museum. She made a list of the expenses. Then she wrote the following expression to show how she can calculate the total cost.

$$6 \times (4.20 + 8 + 12 + 3.50)$$

How many people do you think are in the family?
How can you tell?

Museum Trip Expense (per person)
Roundtrip bus fare: \$4.20
Buffet lunch: \$8
Entrance fee: \$12
Dinosaur lecture: \$3.50

In the expression, the cost of the trip expenses is in parentheses for 1 person. Then it is multiplied by 6 to represent 6 people in the family.

Lesson 13-4

Interpret Numerical Expressions

I can ...

interpret numerical expressions without evaluating them.

Content Standard 5.OA.A.2
Mathematical Practices MP.2, MP.3, MP.7



Use Structure

You can interpret the relationships in numerical expressions without doing any calculations.

Look Back! **MP.7 Use Structure** While they are at the museum, the family decides to watch a movie about earthquakes for \$2.75 per person. Jana and Kay disagree as to how they should adjust Mrs. Katz's expression to find the total expenses for the trip.

Jana says the expression should be $6 \times (4.20 + 8 + 12 + 3.50) + 2.75$.

Kay says the expression should be $6 \times (4.20 + 8 + 12 + 3.50 + 2.75)$.

Who is correct? Explain.

Kay, the cost of the movie is added to the total expenses and then multiplied by 6.

Essential Question
How Can You Interpret Numerical Expressions Without Evaluating Them?

Jimmy's clown costume requires $\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4}$ yards of fabric.

His dad's matching clown costume requires $3 \times (\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4})$ yards.

How does the amount of fabric needed for the dad's costume compare to the amount needed for Jimmy's costume?

Child's Clown Costume



Fabric	
Blue	$\frac{7}{8}$ yd
Yellow	$\frac{1}{2}$ yd
Polka	$1\frac{3}{4}$ yd
Dot	



You can compare the expressions and solve the problem without doing any calculations.

b Interpret the part of each expression that is the same.

$$\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4}$$

$$3 \times (\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4})$$

Both expressions contain the sum $\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4}$. This is the amount of fabric needed for Jimmy's costume.

c Interpret the part of each expression that is different.

$$\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4}$$

$$3 \times (\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4})$$

The second expression shows that the sum is multiplied by 3.

So, the dad's costume requires 3 times as much fabric as Jimmy's costume.

Remember, multiplying by 3 means "3 times as much."



Convince Me! **MP.2 Reasoning** The 7 students in a sewing class equally share the cost of fabric and other supplies. Last month, each student paid $(\$167.94 + \$21.41) \div 7$. This month, each student paid $(\$77.23 + \$6.49) \div 7$. Without doing any calculations, in which month did each student pay more? Explain.

Last month they paid more. Each month is divided by 7 students, but the addends are greater last month than this month.

☆ Guided Practice

Do You Understand?

1. The number of yards of fabric needed for Rob's costume is $(\frac{7}{8} + \frac{1}{2} + 1\frac{3}{4}) \div 2$. How does the amount of fabric needed for Rob's costume compare to the amount needed for Jimmy's costume? Explain.

Rob's costume needs half as much fabric as Jimmy's.

2. **MP.2 Reasoning** Without doing any calculations, explain why the following number sentence is true.

$$14 + (413 \times 7) > 6 + (413 \times 7)$$

Adding 14 to the same product is greater than adding 6.

Do You Know How?

Without doing any calculations, describe how Expression A compares to Expression B.

3. A $8 \times (41,516 - 987)$
B $41,516 - 987$

A is 8 times greater than B | B is 1/8 of A.

In 4 and 5, without doing any calculations, write $>$, $<$, or $=$.

4. $7 \times (4\frac{3}{8} + 3\frac{1}{2})$ $22 \times (4\frac{3}{8} + 3\frac{1}{2})$

5. $8(7 \div 5)$ $(7.1 \div 5) + 8.2$

☆ Independent Practice

In 6 and 7, without doing any calculations, describe how Expression A compares to Expression B.

6. A $(613 + 15,090) \div 4$
B $613 + 15,090$

A is 1/4 of B or B is 4 times greater than A

7. A $(418 \times \frac{1}{4}) + (418 \times \frac{1}{2})$
B $418 \times \frac{3}{4}$

Distributive Property
 $= 418 \times (\frac{1}{4} + \frac{1}{2}) = 418 \times \frac{3}{4}$

A is equal to B.

In 8-11, without doing any calculations, write $>$, $<$, or $=$.

8. $(284 + 910) \div 30$ $(284 + 7,816) \div 30$ 9. $\frac{1}{3} \times (5,366 - 117)$ $5,366 < 117$

Multiplying by a number less than 1 ...

10. $71 + (13,888 - 4,296)$ $70 + (13,888 - 4,296)$

11. $15 \times (3.6 + 9.44)$ $(15 \times 3.6) + (15 \times 9.44)$

Distributive Property

*For another example, see Set C on page 768.

Math Practices and Problem Solving

12. **MP.7 Use Structure** A 4-story parking garage has spaces for $240 + 285 + 250 + 267$ cars. While one floor is closed for repairs, the garage has spaces for $240 + 250 + 267$ cars. How many spaces are there on the floor that is closed? Explain.

13. **MP.3 Construct Arguments** Peter bought $4 \times \left(2\frac{1}{4} + \frac{1}{2} + 2\frac{7}{8}\right)$ yards of ribbon. Marilyn bought $4 \times \left(2\frac{1}{4} + \frac{1}{2} + 3\right)$ yards of ribbon. Without doing any calculations, determine who bought more ribbon. Explain.

14. Brook's score in a card game is $713 + 102 + 516$. On her next turn, she draws one of the cards shown. Now her score is $(713 + 102 + 516) \div 2$. Which card did Brook draw? Explain.



15. Marta bought a 0.25-kilogram box of fish food. She uses 80 grams a week. Is one box of fish food enough for 4 weeks? Explain.

16. **Higher Order Thinking** How can you tell that $(496 + 77 + 189) \times 10$ is twice as large as $(496 + 77 + 189) \times 5$ without doing complicated calculations?

The addition in parentheses is equal. Multiplying by 10 will give a product twice as much as multiplying by 5.

Common Core Assessment

17. The area of Sally's classroom is 21.5×41 square feet. The area of Georgia's classroom is $(21.5 \times 41) - 56$ square feet. Without doing any calculations, determine how the area of Georgia's classroom compares to the area of Sally's classroom. Explain.

Georgia's classroom is 56 ft^2 smaller than Sally's classroom because she takes away 56 ft^2 from the area.