Task: Writing and Evaluating Expressions

Mathematical Goals

- The student will be able to write, read, and evaluate expressions in which letters stand for numbers.
- The student will be able to write expressions that record operations with numbers and with letters standing for numbers.
- The student will be able to evaluate expressions at specific values of their variables including known formulas.

Common Core State Standards

MCC6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.

MCC6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5-y.*

MCC6.EE.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.

MCC6.EE.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$.

Introduction

Write a numerical expression for each statement.

The sum of 14 + 25	The difference between 27 and 45
Two times 3 added to 4	12 divided by 3 increased by 5

In which statements does the order of solving matter?

Materials Required

You will need copies of problems for students.
If available, provide student access to Algebra Tiles or Algeblocks for modeling expressions.

Time Needed

2 days

Exploration

Teacher Notes:

It is recommended that students work in groups to complete this exploration. Have each group post their solutions around the room and then provide time for groups to look at other students work before the summary portion of the lesson.

Part I

Mr. Green's Math class is planning a trip to the IMAX Theater. It will cost $10 for the school bus and the price of a ticket is $13 dollars per student.

What will it cost for 1 student to go on the trip? ***$23***

What will it cost for 2 students to go on the trip? ***$36***

What will it cost for 4 students to go on the trip?***$62***

Describe how you calculated the total cost for each situation.

What are the constant quantities in this problem? ***$10***

What are the variable quantities in this problem? ***Number of students***

Let's write an expression to show that.***$10 + $13n where n is the number of students who will attend.***

How much will it cost if 10 students attend?***$140***

How much will it cost if 17 students attend?***$231***

It is recommended that students work in groups to complete this exploration. Have each group post their solutions around the room and then provide time for groups to look at other students work before the summary portion of the lesson.

Part II

1. Mr. White drives 55 km a day for work. How many km will he drive in:
   a. 5 days? ***275 km***

   b. 8 days? ***440 km***

   c. 15 days? ***825 km***

   d. Write an expression to represent the number of km he will drive in d days***55d, where d = number of work days***

2. Sean's father is working on a crew that will build a skyscraper. He found out that each story is 13 ft tall. How tall, in feet, would the skyscraper be if it were:

a. 55 floors? ***715 feet***

b. 65 floors? ***845 feet***

c. 75 floors? ***975 feet***

d. Write an expression to represent the height of a skyscraper with f stories ***13f, where f = number of floors***

3. 55 figurines of a miniature porcelain doll can be safely shipped in a case. A distributor is investigating to find which size box is the safest to hold the largest number of cases. How many figurines could be shipped in a box that could hold:

a. 750 cases? ***41,250 figurines***

b. 1000 cases? ***55,000 figurines***

c. 1250 cases?***68,750 figurines***

d. Write an expression to represent the number of figurines can be shipped in a box that holds c cases ***55c, where c = number of cases***

4.The rental fee for a mo-ped is $10 plus $3 for each hour the bike is used. How much will it cost if you rent the mo-ped for:

a. 1 hour? ***$13***

b. 8 hours? ***$34***

c. 1 day? ***$82***

d. Write an expression that represents the cost for h hours ***$10 + $3h, where h = number of hours the bike is used***

5.A wireless service provider charges $29.99 per month for service plus $0.10 for each text message. How much will it cost if:

a. 35 text messages are sent? ***$33.49***

b. 105 text messages are sent? ***$40.49***

c. 217 text messages are sent? ***$51.69***

d. Write an expression to represent the cost if t text messages are sent ***$29.99 +$0.10t, where t = number of text messages***

During the Lesson

Allow students to struggle with this process. Direct their attention to the list created at the beginning of the class for guidance. Ask questions to guide student thinking. Suggest manipulatives or drawing pictures for modeling.
Fluency with multi-digit computations is reinforced through this task along with the focus of being able to translate words into expressions.

Summary

When students are sharing their work make sure they explain why they chose the operation that they chose.

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Exploration

Part I
Mr. Green's Math class is planning a trip to the IMAX Theater. It will cost $10 for the school bus and the price of a ticket is $13 dollars per student.

What will it cost for 1 student to go on the trip?

What will it cost for 2 students to go on the trip?

What will it cost for 4 students to go on the trip?

Describe how you calculated the total cost for each situation.

What are the constant quantities in this problem?

What are the variable quantities in this problem?

Let's write an expression to show that.

How much will it cost if 10 students attend?

How much will it cost if 17 students attend?Draw a model to represent this situation

Part II

For the first five problems read each carefully and write an expression that includes numbers and variables. Then, evaluate the expression using the numbers indicated. For the last five problems evaluate the expression for the numbers provided.

1. Mr. White drives 55 km a day for work. How many km will he drive in:
    a. 5 days?
    b. 8 days?
    c. 15 days?
    d. Write an expression to represent the number of km he will drive in d days

2. Sean's father is working on a crew that will build a skyscraper. He found out that each story is 13 ft tall. How tall, in feet, would the skyscraper be if it were:

    a. 55 stories?

    b. 65 stories?

    c. 75 stories?

    d. Write an expression to represent the height of a skyscraper with f stories

3. 55 figurines of a porcelain doll can be safely shipped in a case. A distributor is investigating to find which size box is the safest to hold the largest number of cases. How many figurines could be shipped in a box that could hold:

    a. 750 cases?

    b. 1000 cases?

    c. 1250 cases?

    d. Write an expression to represent the number of figurines can be shipped in a box that holds c cases

4. The rental fee for a bike is $10 plus $3 for each hour the bike is used. How much will it cost if you rent the bike for:

    a. 1 hour?

    b. 8 hours?

    c. 1 day?

    d. Write an expression that represents the cost for h hours

5. A wireless service provider charges $29.99 per month for service plus $0.10 for each text message. How much will it cost if:

a. 35 text messages are sent?

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