

Operations and Algebraic Thinking
CCSSO Math SCASS
October 1-3

Complete the tasks, and think about what standards or clusters they illustrate within the OA domain. Also consider their connection to A-SSE.

1. Comparing Products

Leo and Silvia are looking at the following problem:

How does the product of 60×225 compare to the product of 30×225 ?

Silvia says she can compare these products without multiplying the numbers out. Explain how she might do this. Draw pictures to illustrate your explanation.

2. Video Game Scores

Eric is playing a video game. At a certain point in the game, he has 31500 points. Then the following events happen, in order:

- He earns 2450 additional points.
 - He loses 3310 points.
 - The game ends, and his score doubles.
- a. Write an expression for the number of points Eric has at the end of the game. Do not evaluate the expression. The expression should keep track of what happens in each step listed above.
- b. Eric's sister Leila plays the same game. When she is finished playing, her score is given by the expression

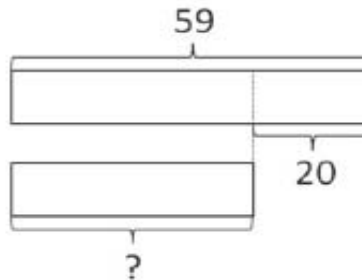
$$3(24500 + 3610) - 6780.$$

Describe a sequence of events that might have led to Leila earning this score.

3. Pencil and a Sticker

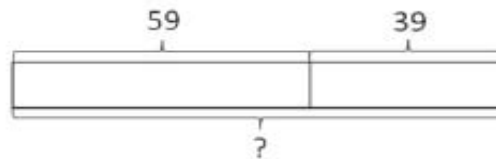
A pencil costs 59 cents, and a sticker costs 20 cents less. How much do a pencil and a sticker cost together?

The pencil costs 59 cents, and the sticker costs 20 cents less than that:



So the sticker costs $59 - 20 = 39$ cents.

The cost of the two together:



is $59 + 39 = 98$ cents.

4. Analyzing word problems involving multiplication

Many problems can be solved in different ways. Decide if the following word problems can be solved using multiplication. Explain your thinking.

- Liam is cooking potatoes. The recipe says you need 5 minutes for every pound you are cooking. How many minutes will it take for Liam to cook 12 pounds of potatoes?
- Mel is designing cards. She has 4 different colors of paper and 7 different pictures she can glue on the paper. How many different cards can she make with one color of paper and one picture?
- Nina can practice a song 6 times in an hour. If she wants to practice the song 30 times before the recital, how many hours does she need to practice?
- Owen is building a rectangular tile patio that is 4 tiles wide and 6 tiles long. How many tiles does he need?

Expressions and Equations
CCSSO Math SCASS
October 1-3

Complete the tasks, and think about what standards or clusters they illustrate within the EE domain. Also consider their connection to A-SSE.

1. What might a student be thinking if they try find the following expressions equivalent to: $7 - 2(3 - 8x)$

$5(3 - 8x)$	
$7 - 2(-5x)$	
$7 - 6 - 16x$	

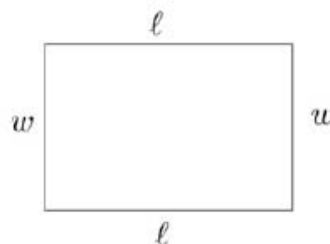
2. Equivalent Expressions?

If we multiply $\frac{x}{2} + \frac{3}{4}$ by 4, we get $2x + 3$. Is $2x + 3$ an equivalent expression to $\frac{x}{2} + \frac{3}{4}$?

3. Rectangle Perimeter

The students in Mr. Nolan's class are writing expressions for the perimeter of a rectangle of side length ℓ and width w . After they share their answers, the following expressions are on the board:

- Sam: $2(\ell + w)$
- Joanna: $\ell + w + \ell + w$
- Kiyoo: $2\ell + w$
- Erica: $2w + 2\ell$



Which of the expressions are correct and how might the students have been thinking about finding the perimeter of the rectangle?

4. Miles to kilometers

The students in Mr. Sanchez's class are converting distances measured in miles to kilometers. To estimate the number of kilometers, Abby takes the number of miles, doubles it, then subtracts 20% of the result. Renato first divides the number of miles by 5, then multiplies the result by 8.

- Write an algebraic expression for each method.
- Use your answer to part (a) to decide if the two methods give the same answer.

5. Distance to school

Some of the students at Kahlo Middle School like to ride their bikes to and from school. They always ride unless it rains.

Let d be the distance in miles from a student's home to the school. Write two different expressions that represent how far a student travels by bike in a four week period if there is one rainy day each week.

6. Money from Grandma

Daniel went to visit his grandmother, who gave him \$5.50. Then he bought a book costing \$9.20. If he has \$2.30 left, how much money did he have before visiting his grandmother?

7. Slab of Soap

If a bar of soap balances $\frac{3}{4}$ of a bar of soap and $\frac{3}{4}$ of a pound, how much does the bar of soap weigh?

8. Fishing Adventures 2

Fishing Adventures rents small fishing boats to tourists for day-long fishing trips. Each boat can only carry 1200 pounds of people and gear for safety reasons. Assume the average weight of a person is 150 pounds. Each group will require 200 lbs of gear for the boat plus 10 lbs of gear for each person.

- a. Create an inequality describing the restrictions on the number of people possible in a rented boat. Graph the solution set.
- b. Several groups of people wish to rent a boat. Group 1 has 4 people. Group 2 has 5 people. Group 3 has 8 people. Which of the groups, if any, can safely rent a boat? What is the maximum number of people that may rent a boat?

Seeing Structure in Expressions
CCSSO Math SCASS
October 1-3

Complete the four tasks, and think about what standards or clusters they illustrate within the SSE domain.

1. Delivery Trucks

A company uses two different-sized trucks to deliver sand. The first truck can transport x cubic yards, and the second y cubic yards. The first truck makes S trips to a job site, while the second makes T trips. What do the following expressions represent in practical terms?

- a. $S + T$
- b. $x + y$
- c. $xS + yT$
- d. $\frac{xS + yT}{S + T}$

2. Profit of a Company

The profit a company makes selling an item depends on the price $\$p$ of the item. Three equivalent forms for the profit are:

Standard form: $-2p^2 + 24p - 54$

Factored form: $-2(p - 3)(p - 9)$

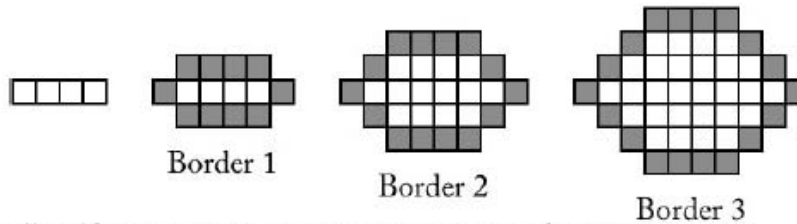
Vertex form: $-2(p - 6)^2 + 18.$

Which form is most useful for finding

- a. The prices that give a profit of zero dollars?
- b. The profit when the price is zero?
- c. The price that gives the maximum profit?

3. Kitchen Floor Tiles

Fred decides to cover the kitchen floor with tiles of different colors. He starts with a row of four tiles of the same color. He surrounds these four tiles with a border of tiles of a different color (Border 1). The design continues as shown below:



Dina writes, $t = 4(b - 1) + 10$ where t is the number of tiles in each border and b is the border number.

- Explain why Dina's equation is correct.
- Emma wants to start with five tiles in a row. She reasons, "Dina started with four tiles and her equation was $t = 4(b - 1) + 10$. So if I start with five tiles, the equation will be $t = 5(b - 1) + 10$. Is Emma's statement correct? Explain your reasoning.
- If Emma starts with a row of n tiles, what should the formula be?

4. Ice Cream

After a container of ice cream has been sitting in a room for t minutes, its temperature in degrees Fahrenheit is

$$a - b2^{-t} + b,$$

where a and b are positive constants. Write this expression in a form that

- Shows that the temperature is always less than $a + b$.
- Shows that the temperature is always greater than a .