

**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:  $-2(p - 3)(p - 9)$

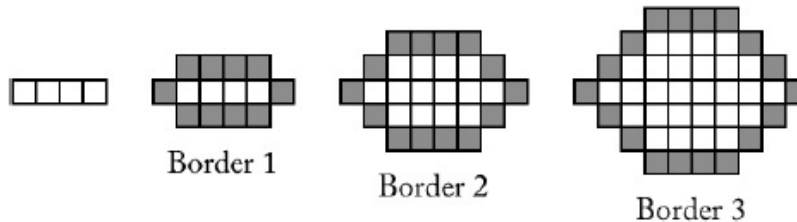
Vertex form:  $-2(p - 6)^2 + 18.$

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  $a$ .