



Lesson 10: The Distributive Property and the Products of Decimals

Student Outcomes

- Through the use of arrays and partial products, students use place value and apply the distributive property to find the product of decimals.

Lesson Notes

Stations are used in this lesson. Therefore, some prep work needs to be completed. Prepare stations before class and have a stopwatch available.

Classwork

Opening Exercise (3 minutes)

The Opening Exercise should be solved using the multiplication of decimals algorithm. These problems will be revisited in Examples 1 and 2 to show how partial products can assist in finding the product of decimals.

Opening Exercise

Calculate the product.

a. 200×32.6
 $6,520$

b. 500×22.12
 $11,060$

Example 1 (5 minutes): Introduction to Partial Products

Show students how the distributive property can assist in calculating the product of decimals. Use this example to model the process.

Example 1: Introduction to Partial Products

Use partial products and the distributive property to calculate the product.

$$200 \times 32.6$$

$$200(32) + 200(0.6) = 6,400 + 120 = 6,520$$

Separate 32.6 into an addition expression with two addends, 32 and 0.6. Emphasize the importance of the place value. The problem will now be $200 \times (32 + 0.6)$.

When the distributive property is applied, the problem will be $200(32) + 200(0.6)$.

MP.7

MP.7

It is ideal for students to be able to solve these problems mentally using the distributive property, but we understand if additional scaffolding is needed for struggling students. Remind students that they need to complete the multiplication before adding. After giving students time to solve the problem, ask for their solutions.

Show students that the answer to this example is the same as the Opening Exercise but that most of the calculations in this example could be completed mentally.

Example 2 (7 minutes): Introduction to Partial Products

Have students try to calculate the product by using partial products. After they complete the problem, encourage students to check their answers by comparing it to the product of the second problem in the Opening Exercise. When a majority of the class has completed the problem, have some students share the processes they used to find the product. Answer all student questions before moving on to the Exercises.

Scaffolding:

Possible extension: Have students complete more than two partial products. An example would be $500(20 + 2 + 0.1 + 0.02)$.

Example 2

Use partial products and the distributive property to calculate the area of the rectangular patio shown below.

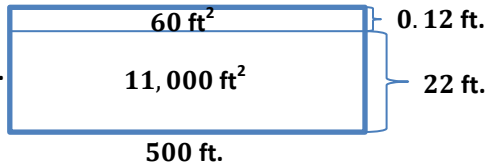
22.12 ft.



500 ft.

$$500 \times 22.12 = 500(22 + 0.12) = 500(22) + 500(0.12) = 11,000 + 60 = 11,060 \text{ square feet}$$

22.12 ft.



500 ft.

The area of the patio would be 11,060 square feet.

Exercises (20 minutes)

MP.7

Students complete stations individually or in pairs. Encourage students to use partial products in order to solve the problems. Students are to write the problem and their processes in the space provided in the student materials.

Remind students to record each station in the correct place because not everyone will start at station one.

Exercises

Use the boxes below to show your work for each station. Make sure that you are putting the solution for each station in the correct box.

Station One:

Calculate the product of 300×25.4 .

$$300(25) + 300(0.4) = 7,500 + 120 = 7,620$$

Station Two:

Calculate the product of 45.9×100 .

$$100(45) + 100(0.9) = 4,500 + 90 = 4,590$$

Station Three:

Calculate the product of 800×12.3 .

$$800(12) + 800(0.3) = 9,600 + 240 = 9,840$$

Station Four:

Calculate the product of 400×21.8 .

$$400(21) + 400(0.8) = 8,400 + 320 = 8,720$$

Station Five:

Calculate the product of 32.6×200 .

$$200(32) + 200(0.6) = 6,400 + 120 = 6,520$$

Closing (6 minutes)

Students share their answers to the stations and ask any unanswered questions.

Exit Ticket (4 minutes)

Name _____

Date _____

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Exit Ticket

Complete the problem using partial products.

$$500 \times 12.7$$

Exit Ticket Sample Solutions

Complete the problem using partial products.

$$500 \times 12.7$$

$$500 \times 12.7 = 500(12) + 500(0.7) = 6,000 + 350 = 6,350$$

Problem Set Sample Solutions

Calculate the product using partial products.

1. 400×45.2

$$400(45) + 400(0.2) = 18,000 + 80 = 18,080$$

2. 14.9×100

$$100(14) + 100(0.9) = 1,400 + 90 = 1,490$$

3. 200×38.4

$$200(38) + 200(0.4) = 7,600 + 80 = 7,680$$

4. 900×20.7

$$900(20) + 900(0.7) = 18,000 + 630 = 18,630$$

5. 76.2×200

$$200(76) + 200(0.2) = 15,200 + 40 = 15,240$$