

# Concept: Multiplication and Division of Decimals

Name: \_\_\_\_\_

## PART A: COMPUTER COMPONENT

### Instructions:

In follow the **Content Menu** path:

**Fractions > Multiplication and Division of Decimals**

Work through all Sub Lessons of the following Lessons **in order**:

- *Recall the Basics*
- *Multiply by Repeated Addition*
- *Special Case - Multiply a Decimal by a Whole Number*
- *Multiply by Partial Products- Area*
- *Distributive Method*
- *Standard Method*

NOTE: You will not be finishing the entire section before stopping to complete some **OFF COMPUTER EXERCISES**.



As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

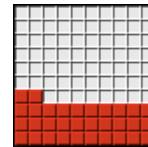
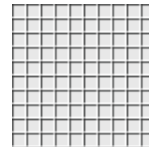
When you reach the end of the lesson *Standard Method* on the computer, move on to the **OFF COMPUTER EXERCISES** below.

## NOTES

### 1. Multiply by Repeated Addition

We think...

$0 \frac{32}{100}$  of the large squares are *red*.



0.32 of the large squares are *red*.

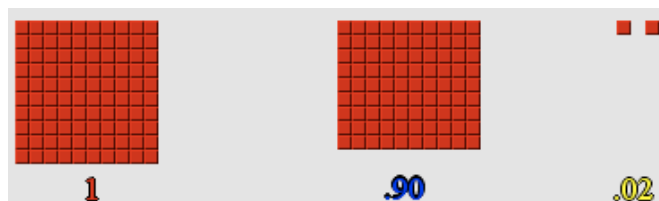
We want to multiply  $6 \times 0.32$ .

This means, we want 6 groups of 0.32.

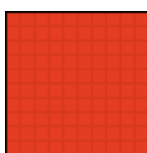


$$6 \times 0.32 = 0.32 + 0.32 + 0.32 + 0.32 + 0.32 + 0.32$$

$$= 1.92$$



## 2. Special Case: Multiply a Decimal by a Whole Number



Large Red Square = 1

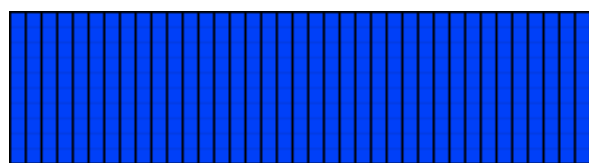
We want to multiply  $2 \times 3.7$

This means, we want 2 groups of 3.7.



**3.7 Ones**

We can also say that the entire large rectangle is 37 tenths.



**37 Tenths**

When we multiply  $2 \times 3.7$ ...is the same as multiplying  $2 \times 37$  tenths.

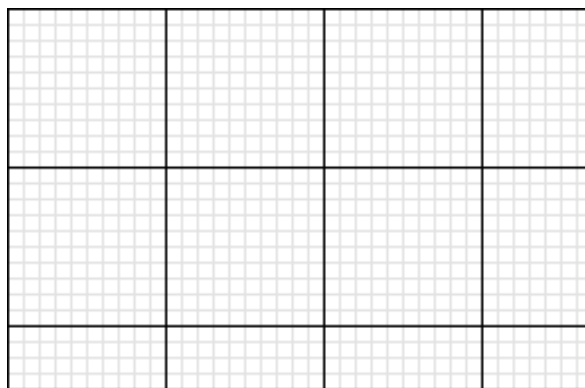
$$\begin{array}{r} 37 \text{ Tenths} \\ \times 2 \\ \hline 74 \text{ Tenths} = 7.4 \text{ Ones} \end{array}$$

### 3. Multiply by Partial Products

(a) We want to multiply  $2 \times 3.7$ .

This means, we want 2 groups of 3.7.

We want to find the area of the rectangle.



To help us:



= 1

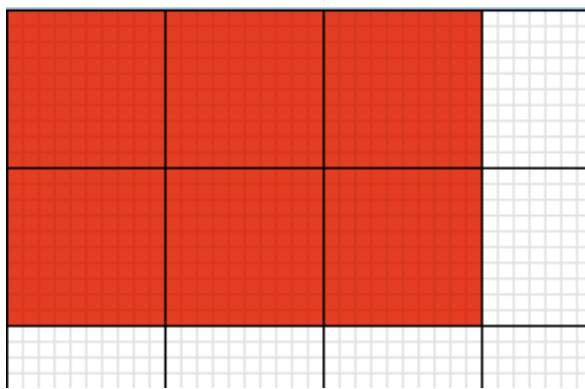


= 0.1 or 1 tenth

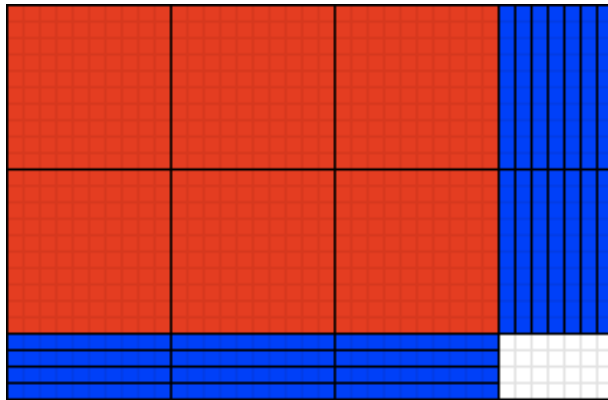


= 0.01 or 1 hundredth

➤ First, we add as many whole (ones) blocks as possible to the rectangle.

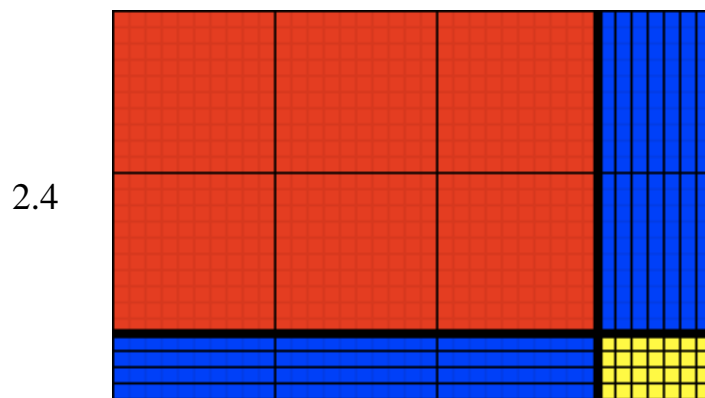


- Then, we add as many tenths blocks as possible to the rectangle.



- Now, we add as many hundredths blocks as possible to the rectangle.

3.7



*We want to multiply  $2.4 \times 3.7$ .*

*We want to find the **AREA** of the rectangle.*

**Part 1**

= ( \_\_\_\_\_  $\times$  \_\_\_\_\_ ) Hundredths

=

**Part 2**

= ( \_\_\_\_\_  $\times$  \_\_\_\_\_ ) Tenths

=

**Part 3**

$$= (\text{_____} \times \text{_____}) \text{ Tenths}$$

$$=$$
**Part 4**

$$= (\text{_____} \times \text{_____}) \text{ Ones}$$

$$=$$

$$2.4 \times 3.7 = \text{Area of Part 1} + \text{Area of Part 2} + \text{Area of Part 3} + \text{Area of Part 4}$$

$$= \text{_____}$$

$$= \underline{\underline{8.88}}$$

(b) We want to multiply  $2.2 \times 4.2$  (without blocks)

		$\begin{array}{r} 4.2 \\ \times 2.2 \\ \hline \end{array}$
Hundredths ( _____ × _____ )	→	
Tenths ( _____ × _____ )	→	
Tenths ( _____ × _____ )	→	
Ones ( _____ × _____ )	→	
	<b>Product</b>	<b><u>9.24</u></b>

**4. Multiply by the Distributive Method**

The Distributive Method simply **distributes** numbers, so that they are easier to work with.

We want to multiply  $1.3 \times 3.21$

$$\begin{array}{r} 3.21 \\ \times 1.3 \\ \hline \end{array}$$

**Part 1**

$$\begin{array}{r}
 3.21 \quad \longrightarrow \\
 \times 1.3 \quad \longrightarrow
 \end{array}
 \qquad
 \begin{array}{l}
 (3 + 0.2 + \underline{\hspace{1cm}}) \\
 (1 + \underline{\hspace{1cm}})
 \end{array}$$

**Part 2**

$$\begin{array}{r}
 (3 + 0.2 + 0.01) \\
 \times (1 + 0.3)
 \end{array}
 \qquad
 \text{which is the same as}
 \qquad
 (1 + 0.3) \times (3 + 0.2 + 0.01)$$

**Part 3**

$$\begin{array}{c}
 \overbrace{\hspace{10em}} \\
 \downarrow \quad \downarrow \quad \downarrow \\
 (1 + \quad 0.3) \times (3 + 0.2 + 0.01) \\
 \underbrace{\hspace{10em}} \\
 \uparrow \quad \uparrow \quad \uparrow
 \end{array}$$

Each number, in the first set of brackets is multiplied by every number in the second set of brackets. Therefore, in this case, we should have 6 products to add for our final answer.

**Part 4**

$$\begin{array}{r}
 \underline{\hspace{2cm}} \\
 \underline{\hspace{2cm}} \\
 \underline{\hspace{2cm}} \\
 \underline{\hspace{2cm}} \\
 \underline{\hspace{2cm}} \\
 + \\
 \underline{\hspace{2cm}}
 \end{array}$$

**Final Answer**    **4.173**

**5. Standard Method**

You may use the computer prompts to assist you with this. *(If necessary)*

$$\begin{array}{r}
 3.7 \\
 \times 2.4 \\
 \hline
 8.8
 \end{array}$$

**Reflection**

*Which strategy do you feel is the best suited to your learning style? Why?*

*(Results will vary)*

**OFF COMPUTER EXERCISES**

*For this first set of questions, try to use a different strategy each time.*

1. Multiply the following.

(a)  $3.2 \times 6.3 = \mathbf{20.16}$

(b)  $2.5 \times 3.3 = \mathbf{8.25}$

(c)  $4.12 \times 2.3 = \mathbf{9.476}$

(d)  $1.6 \times 3.22 = \mathbf{5.15}$

2. Complete the following problems. *You may use your preferred method for these.*

- (a) Isabella lost the results of her calculation multiplying  $0.512 \times 2.04$ . Based on her notes, she knows that it is one of 1.04882, 1.04448, 10.4448, or 0.10448. Alexander immediately tells her the answer, without calculating. *Which number is the answer? How did he know?*

*Alexander knows that the answer is 1.04448 because the first digits to be multiplied are a 4 and a 2 which will result in an 8 in the furthest column to the right. In addition, 2.04 is multiplied by 0.512, which result in a product that is almost half of 2.04.*

- (b) Jamal earns \$6.25/hr working at the local *Foot Zone*. His Saturday shift starts at 9 am and concludes at 1:30 pm. *How much money will Jamal earn before taxes?*

$$\mathbf{\$6.25 \times 4.50 = \$28.13}$$

*Jamal will earn \$28.13 before taxes.*

- (c) If coffee costs \$8.25 per pound, *how much did Archie pay for 3.5 pounds?*

$$\mathbf{\$8.25 \times 3.5 = \$28.88}$$

*Archie paid \$28.88 for 3.5 pounds.*

- (d) Two numbers multiply together to get 15.4. *What might the two numbers be?*

$$\mathbf{2 \times 7.7 = 15.4}$$

$$\mathbf{4 \times 3.85 = 15.4}$$

*(There are many more possibilities)*

(e) I multiplied two decimal numbers on a calculator and the answer was a whole number. *What might the two decimal numbers be?*

$$2.5 \times 3.2 = 8$$

*(There are many more possibilities)*

(f)  $?.? \times ?.? = ?.?$  *What might the missing numbers be?*

$$3.0 \times 3.1 = 9.3, \quad 3.5 \times 1.4 = 4.9 \text{ (List not exhaustive)}$$

3. *After completing some questions, which strategy/method would you prefer to use? Why?*

*(Answers will vary)*