

Decimal Multiplication-3

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Further master the method of calculating decimal multiplication and understand the relationship between the product and the size of the multipliers.

Be able to apply the rules of integer multiplication to decimal multiplication and perform convenient calculations .

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The calculation method for decimal multiplication

Ignore the Decimal Point: First, multiply the numbers as if they were whole numbers, ignoring the decimal points.

Multiply as Usual: Perform the multiplication just as you would with whole numbers.

Count the Decimal Places: After multiplying, count the total number of decimal places in the numbers you multiplied (i.e., the number of digits to the right of the decimal points in both numbers).

Place the Decimal Point: In the product, place the decimal point so that the number of decimal places in the result equals the total number of decimal places counted in step 3. If there are not enough digits, add zeros to the left of the product. If the product has trailing zeros, place the decimal point first and then remove the trailing zeros.



Explore

A strand of silk spun by an autumn silkworm is about 1.2 km long and weighs 0.35 g. The silk spun by a spring silkworm is longer, approximately 1.25 times that of an autumn silkworm.



How long is the silk spun by a spring silkworm, approximately in kilometers?

$$1.2 \times 1.25 = 1.5 \text{ (km)}$$

$$\begin{array}{r} 1.25 \\ \times 1.2 \\ \hline 250 \\ 125 \\ \hline 1.500 \end{array}$$

Answer: The silk spun by a spring silkworm is approximately 1.5 kilometers long.

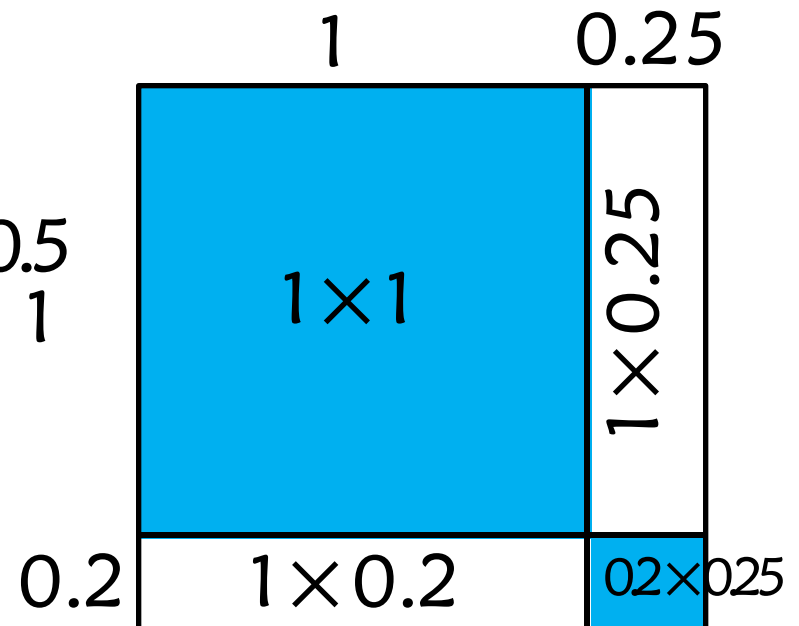


Explore


A strand of silk spun by an autumn silkworm is about 1.2 km long and weighs 0.35 g. The silk spun by a spring silkworm is longer, approximately 1.25 times that of an autumn silkworm.

- How long is the silk spun by a spring silkworm, approximately in kilometers?

$$\begin{aligned}
 & 1.2 \times 1.25 \\
 & = \underline{1 \times 1 + 1 \times 0.25 + 0.2 \times 1} + 0.2 \times 0.25 \\
 & = 1.05 \text{ (km)}
 \end{aligned}$$



Explore

-  It takes about 300 autumn silkworms' silk to weave one scarf. What is the approximate weight of the scarf in grams?

$$0.35 \times 300 = 105 \text{ (g)}$$

$$\begin{array}{r} 0.35 \\ \times \quad 300 \\ \hline 105.00 \end{array}$$

Answer: The weight of one scarf is approximately 105 grams.

Explore



Think about it: What should you pay attention to when calculating decimal multiplication?

| | | | |
|--------------|------|-----|-------|
| $2.3 \times$ | 1.2 | $=$ | 2.76 |
| | 1.05 | | 2.415 |
| | 1 | | 2.3 |
| | 0.9 | | 2.07 |
| | 0.86 | | 1.978 |

Is the product
always larger
than the
factors?



Practice

$$0.06 \times 0.5 = 0.03$$

$$1.25 \times 0.08 = 0.01$$

$$200 \times 0.8 = 160$$

$$0.26 \times 0.3 = 0.078$$


$$3.1 \times 30 = 93$$


$$1.2 \times 60 = 72$$


Example

How much does it cost to buy a 4.6-kilogram watermelon if it costs 0.85 dollars per kilogram? Discuss who calculated it correctly.




$$\begin{array}{r} 4.6 \\ \times 0.85 \\ \hline 230 \\ 368 \\ \hline 0.391 \end{array}$$


$$\begin{array}{r} 4.6 \\ \times 0.85 \\ \hline 230 \\ 368 \\ \hline 0.598 \end{array}$$


$$\begin{array}{r} 4.6 \\ \times 0.85 \\ \hline 230 \\ 368 \\ \hline 3.910 \end{array}$$



Example

Without calculating, can you determine if the following calculations are correct? Discuss with your peers.

$$0.9 \times 1.5 = 13.5$$

product < 1.5

$$9.9 \times 7.1 = 60.29$$

product $> 9 \times 7$

$$2.8 \times 1.5 = 2.4$$

product > 2.8

Example

Place the decimal points in the following results to make the calculations correct.

$$4.8 \times 1.3 = 624$$

$$4.8 \times 0.9 = 432$$

$$9.32 \times 1.4 = 13048$$

$$0.7 \times 9.32 = 6524$$

Practice

First, think about whether the product is larger or smaller than the first factor, then calculate.

$$0.12 \times 50 = 6$$

$$2.6 \times 0.5 = 1.3$$

$$1.3 \times 2.2 = 2.86$$

$$9.6 \times 0.8 = 7.68$$

Compare

$$363 \times 0.9 < 363$$

$$0.89 \times 1 = 0.89$$

$$3.08 \times 1 > 1$$

$$3.25 \times 1.4 = 1.4 \times 3.25$$

Practice

The sika deer is 1.46 meters tall. The giraffe's height is 0.98 meters more than 2.5 times the height of the sika deer. How tall is the giraffe?

$$\begin{aligned} &1.46 \times 2.5 + 0.98 \\ &= 3.65 + 0.98 \\ &= 4.63 \text{ (m)} \end{aligned}$$

$$\begin{aligned} &1.46 \times 2.5 \\ &= 146 \times 25 \div 1000 \\ &= 146 \div 4 \times 100 \div 1000 \\ &= 146 \div 4 \div 10 \\ &= 36.5 \div 10 \\ &= 3.65 \end{aligned}$$

Answer: The giraffe's height is 4.63 meters.

Be able to apply the rules of integer multiplication to decimal multiplication and perform convenient calculations .

Review

$$a \times b = (\underline{a} \times \underline{b})$$

$$a \times b \times c = a \times (\underline{b} \times \underline{c})$$

$$a \times b + a \times c = a \times (\underline{b} + \underline{c})$$

Review

$$25 \times 120 \times 4$$

$$= (25 \times 4) \times 120$$

$$= 100 \times 120$$

$$= 12000$$

$$45 \times 12 + 55 \times 12$$


$$= (45 + 55) \times 12$$

$$= 100 \times 12$$

$$= 1200$$

Practice

| Item | Exercise book | Pencil box | Story book |
|----------------|---------------|------------|------------|
| Unit price(\$) | 2.8 | 6.1 | 7.2 |

 How much will it cost in total for 5 students to each buy 1 exercise book and 1 story book?

$$\begin{aligned} & 2.8 \times 5 + 7.2 \times 5 \\ & = 14 + 36 \\ & = 50 \text{ (dollars)} \end{aligned}$$

$$\begin{aligned} & (2.8 + 7.2) \times 5 \\ & = 10 \times 5 \\ & = 50 \text{ (dollars)} \end{aligned}$$

Practice

Do you remember the associative property of addition?
Please give an example to show that the associative property of addition also applies to decimal addition.

$$a+b+c = a+(b+c)$$

$$\begin{aligned} & 1.89+0.46+3.54 \\ & =1.89+(0.46+3.54) \\ & =1.89+4 \\ & =5.89 \end{aligned}$$

Practice

$$2.5 \times 13 + 0.9 = 33.4$$

$$0.25 \times 3.7 \times 0.4 = 0.37$$

$$1.83 + 3.79 + 0.17 = 5.79$$

$$2.5 \times 0.6 - 1.8 \times 0.5 = 0.6$$

$$2.6 + 1.4 \times 3 = 6.8$$

$$0.89 \times 4.8 + 0.89 \times 5.2 = 8.9$$

$$10 - 0.34 - 0.66 = 9$$

$$(8 + 0.8) \times 1.25 = 11$$

Practice

$$3.65 \times 63 + 36.5 \times 3.7$$

$$= 36.5 \times 6.3 + 36.5 \times 3.7$$

$$= 36.5 \times (6.3 + 3.7)$$

$$= 36.5 \times 10$$

$$= 365$$

$$6.26 \times 12.8 - 0.626 \times 38 + 6.26$$

$$= 6.26 \times 12.8 - 6.26 \times 3.8 + 6.26$$

$$= 6.26 \times (12.8 - 3.8 + 1)$$

$$= 6.26 \times 10$$

$$= 62.6$$

Conclusion

The order of operations for mixed decimal calculations is the same as for mixed integer calculations.

The laws of integer operations also apply to decimals. In decimal mixed operations, these laws can be used to simplify calculations.

