Decimals

Adding and subtracting decimals

To add or subtract decimals, **align the decimal points** and fill empty places with zeros.
Example: $2.36 - 0.193$

$$\begin{array}{r} 2.360 \\ -\ 0.193 \\ \hline 2.167 \end{array}$$

Example: $14.5 + 3.827$

$$\begin{array}{r} 14.500 \\ +\ 3.827 \\ \hline 18.327 \end{array}$$

Multiplying decimals

1. Multiply the numbers **ignoring the decimal points**
2. **Count the total decimal places** in both numbers being multiplied
3. Place the decimal point in the answer so it has that many decimal places

Example: 72.5×3.003
First, multiply $725 \times 3003 = 2177175$.
Count decimal places: 72.5 has 1 place, 3.003 has 3 places $\rightarrow$ total 4 places.
Place the decimal: $2177175 \rightarrow 217.7175$
Therefore, $72.5 \times 3.003 = 217.7175$.
Example: 0.04×1.5
Multiply $4 \times 15 = 60$.
Count decimal places: 0.04 has 2 places, 1.5 has 1 place $\rightarrow$ total 3 places.
Place the decimal: $060 \rightarrow 0.060 = 0.06$
Therefore, $0.04 \times 1.5 = 0.06$.

Dividing decimals

To divide by a decimal:

1. Move the decimal point in the **divisor** to make it a whole number

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2. Move the decimal point in the **dividend** the same number of places
3. Divide as usual, placing the decimal point in the answer directly above its new position in the dividend

$$\text{dividend} \div \text{divisor} = \text{quotient} \qquad \text{or} \qquad \frac{\text{dividend}}{\text{divisor}} = \text{quotient}$$

Example: $84 \div 3.1$

Step 1: Move decimals to make divisor a whole number.

$84 \div 3.1$ becomes $840 \div 31$ (move both one place right)

Step 2: Perform long division.

$$\begin{array}{r} 27.09\ldots \\ 31\overline{)840.00} \\ \underline{62} \\ 220 \\ \underline{217} \\ 30 \\ \underline{0} \\ 300 \\ \underline{279} \\ 21 \end{array}$$

Step 3: Read the answer.

$84 \div 3.1 \approx 27.1$ (rounded to one decimal place)

Long division steps:

1. Divide: How many times does 31 go into 84? $\rightarrow$ 2 times
2. Multiply: $31 \times 2 = 62$
3. Subtract: $84 - 62 = 22$
4. Bring down the next digit (0) $\rightarrow$ 220
5. Repeat: 31 goes into 220 seven times ($31 \times 7 = 217$)
6. Continue until you reach the desired precision

Example: $12.5 \div 0.05$

Move both decimals 2 places right: $1250 \div 5 = 250$

Therefore, $12.5 \div 0.05 = 250$.

Quick reference

Operation	Key rule
Addition/Subtraction	Align decimal points
Multiplication	Count total decimal places in factors; place in answer
Division	Move decimals to make divisor a whole number

Practice problems

1. $5.23 + 0.847$ **2.** $12.4 - 3.56$ **3.** $0.075 + 2.3$ **4.** $8 - 0.125$

5. 2.5×0.4 **6.** 0.03×0.6 **7.** 4.12×2.5 **8.** 0.007×1.1

9. $6.4 \div 0.8$ **10.** $15 \div 0.3$ **11.** $0.144 \div 1.2$ **12.** $2.45 \div 0.05$

Answers: 1. 6.077 2. 8.84 3. 2.375 4. 7.875 5. 1 6. 0.018 7. 10.3 8. 0.0077 9. 8 10. 50 11. 0.12 12. 49

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