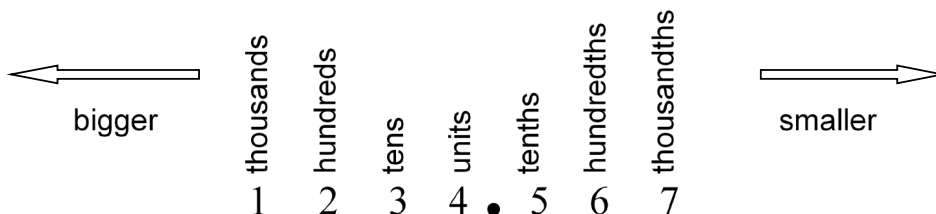


Decimals

In our decimal system the position of a digit is important. Each column counts objects that are ten times larger (or smaller) than the next column



Equivalent Fractions and decimals

0.2 means two tenths or $\frac{2}{10}$

0.35 means 35 hundredths or $\frac{35}{100}$

0.005 means five thousandths or $\frac{5}{1000}$

ADDITION AND SUBTRACTION

Just line up the decimal places and fill in the blanks with 0s if you need to

Example 1. $3.174 + 25.82$

Line up the decimal points

$$\begin{array}{r} 3.174 + \\ \underline{25.82} \end{array}$$

Then add

$$\begin{array}{r} 3.174 + \\ \underline{25.820} \\ 28.994 \end{array}$$

Example 2. $54.9 - 2.06$

Line up the decimal points

$$\begin{array}{r} 54.9 - \\ \underline{2.06} \end{array}$$

Fill the gaps with zeros

$$\begin{array}{r} 54.90 - \\ \underline{2.06} \end{array}$$

Then subtract

$$\begin{array}{r} 54.90 - \\ \underline{2.06} \\ 52.84 \end{array}$$

Line up the decimal point in your answer



MULTIPLICATION

- Ignore the decimal points and do the multiplication normally.
- Count up the number of digits on the right hand side of the decimal point in the question.
- Put the same number of digits on the right hand side of the decimal point in the answer.

Example 1. 1.2×60
 $12 \times 60 = 720$
So $1.2 \times 60 = 72.0$

Ignore the decimal points, just multiply.

One decimal place in the question so make one decimal place in the answer.

Example 2. 0.2×3
 $02 \times 3 = 06$
So $0.2 \times 3 = 0.6$

Ignore the decimal points, just multiply.

One decimal place in the questions so make one decimal place in the answer.

Example 3. 1.2×0.4
 $12 \times 4 = 48$
So $1.2 \times 0.4 = 0.48$

Ignore the decimal points, just multiply.

Two decimal places in the question so make two decimal places in the answer.

Exercises

Addition

- (a) $2.55 + 3.24$
- (b) $6.05 + 20.45$
- (c) $0.16 + 0.05$
- (d) $160 + 25.8$
- (e) $2.05 + 0.08$

Subtraction

- (a) $20 - 8.5$
- (b) $150.5 - 120.3$
- (c) $500 - 245.04$
- (d) $1600 - 25.5$
- (e) $5.1 - 0.07$

Multiplication

- (a) 2.5×0.3
- (b) 32×0.03
- (c) 120×0.4
- (d) 0.06×0.02
- (e) 50.5×1.2

Answers

Addition

- (a) 5.79
- (b) 26.5
- (c) 0.21
- (d) 185.8
- (e) 2.13

Subtraction

- (a) 11.5
- (b) 30.2
- (c) 254.96
- (d) 1574.5
- (e) 5.03

Multiplication

- (a) 0.75
- (b) 0.96
- (c) 48
- (d) 0.0012
- (e) 60.6



DIVISION

When dividing a decimal you line up the decimal place, just like with addition.

Example

$$7 \overline{)2.1}$$

$$7 \overline{)2.1}^{0.3}$$

Line up the decimal place above the one in the question.

Exercises

Division with decimals

(a) $160.25 \div 5$

(b) $423.6 \div 3$

(c) $65.2 \div 4$

(d) $500.8 \div 4$

(e) $1 \div 5$

(f) $4 \div 8$

Answers

Division with decimals

(a) 32.05

(b) 141.2

(c) 16.3

(d) 125.2

(e) 0.2

(f) 0.5

DIVISION: PADDING WITH ZEROS

If you are left with a remainder at the end of the division process, you can always add more 0s to the end of the number you are dividing and continue the process until you have as many decimal places as you like.

Example

To determine $12.3 \div 4$ we write

$$4 \overline{)20.3}$$

Five 4s fit into 20 with no remainder but 4 doesn't fit into the 3 so write

$$4 \overline{)20.3}^{5.0}$$

We haven't actually divided the 3 by the 4 yet! We still have a remainder of 3. We can add zeros to the end of the decimal so we can continue the process for as long as we like or we are left with no remainder. Here I will add two zeros:

Now seven 4s fit into 30 with 2 left over

$$4 \overline{)20.30}^{5.07}$$

And five 4s fit into 20 with no remainder

$$4 \overline{)20.300}^{5.075}$$

And so $12.3 \div 4 = 5.075$



Exercises

Padding with zeros

(a) $1 \div 5$

(b) $4 \div 8$

(c) $1 \div 3$

(d) $2 \div 9$

(e) $13 \div 6$

(f) $11.1 \div 4$

Answers

Padding with zeros

(a) 0.2

(b) 0.5

(c) 0.333 ...

(d) 0.222 ...

(e) 2.166 ... or 2.167 (3 d.p)

(f) 2.775

EQUIVALENT DIVISIONS

If you have to divide by a decimal, you can move the decimal place to the right in both numbers so that you are dividing by a whole number. This will be an equivalent division.

Example

To determine $12 \div 0.03$ we can move the decimal place twice to the right in both numbers to rewrite the division as $1200 \div 3$. Which we can set up as

$$\begin{array}{r} 3 \overline{)1200} \end{array}$$

Since 3 goes into 12 four times with no remainder we get an answer of 400 (yes, there really are four hundreds 0.03s in 12)

$$\begin{array}{r} 400 \\ 3 \overline{)1200} \end{array}$$

Exercises

Equivalent divisions

(a) $3 \div 0.2$

(b) $10 \div 0.25$

(c) $1.5 \div 0.4$

Answers

Equivalent divisions

(b) 40

(c) 3.75