

Addition with fractions

To add together two fractions, you have to make sure that they have a *common* denominator.

Example: Add together $\frac{4}{7}$ and $\frac{17}{21}$

First find *lowest common multiple* (LCM) of denominators:

7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70 ...

21: 21, 42, 63, 84, 105

LCM is 21. Rewrite both fractions with 21 as denominator (2nd fraction done already):

$$\frac{4}{7} \times \frac{3}{3} = \frac{12}{21}$$

Now do calculation:

$$\begin{aligned} \Rightarrow \frac{4}{7} + \frac{17}{21} \\ &= \frac{12}{21} + \frac{17}{21} \\ &= \frac{12+17}{21} \\ &= \frac{29}{21} \\ &= 1\frac{8}{21} \end{aligned}$$

Subtraction with fractions

Same process as for addition.

Multiplication with fractions

1. Multiply the tops of the fraction, in other words the numerators.
2. Multiply the bottoms of the fractions, in other words the denominators.

More Fractions and Decimals

3. Simplify the fraction you get from the multiplication.

$$\frac{4}{7} \times \frac{9}{5} = \frac{4 \times 9}{7 \times 5} = \frac{36}{35}$$

In improper fraction form this is:

$$\frac{36}{35} = 1\frac{1}{35}$$

Dividing with fractions

Same as for multiplication but with one extra step at the beginning:

Step 0: Swap the numerator (top) and denominator (bottom) of the fraction doing the dividing, and change it into a multiplication.

Example: $\frac{12}{5} \div \frac{3}{2}$

Step 0: Swap the 3 and 2 and change it to a multiply:

$$\begin{aligned} \frac{12}{5} \div \frac{3}{2} &= \frac{12}{5} \times \frac{2}{3} \\ &= \frac{24}{15} = \frac{8}{5} \\ &= 1\frac{3}{5} \end{aligned}$$

Decimal Numbers

All decimal numbers have a decimal point in them which separates the part of the number which is larger than one from the part that is smaller than one.

$$215.678 = 200.0 + 10.0 + 5.0 + 0.6 + 0.07 + 0.08$$

Rounding to a number of decimal places

Write the number down, but only to one less than the asked for number of decimal places.

Now find the ‘special’ digit. The ‘special’ digit is the digit located one more decimal place to the right than the number of decimal places you’ve been asked for. So say you’ve been asked for 3 decimal places, look at the value of the digit in the 4th decimal place – this is the ‘special’ digit.

If the ‘special’ digit is 0, 1, 2, 3, or 4, then just write your last decimal place in as it is.

If the ‘special’ digit is a 5 or larger, you need to add one to your last decimal place.

0.777777777 to 3 decimal places becomes 0.778

Rounding to a number of significant figures

A digit is counted as a significant digit *except* in the case of zeros directly after a decimal point for a number that is smaller than 1. For instance, look at the following numbers:

427 has 3 significant digits, 0.5234 has 4 significant digits, 0.000023 only has 2 significant digits.

Rounding is same process as for decimal rounding, but start from the leftmost significant figure.

1652 to two significant figures:

- The special digit is a ‘5’. Because 5 is larger than 4, we need to add one to the last significant digit – the 6 becomes 7.
- Answer is 1.7×10^3 . We don’t write 1700, since that tells the reader it is accurate to 4 significant figures.