

Lessons of mathematics in English

Operations with fractions

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Addition and subtraction of fractions with the same denominators

$$\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$$

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If the fractions have the same denominator we have to add or subtract its numerators

$$\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$$

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**We can reduce fractions,
if we divide the numerator
and the denominator by the
same number without
remainder**

$$\frac{30}{40} = \frac{15}{20} = \frac{3}{5}$$

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**We can expand fractions,
if we multiply the
numerator and the
denominator by the same
number.**

$$\frac{3}{5} = \frac{6}{10} = \frac{12}{20}$$

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Addition and subtraction of fractions with different denominators

$$\frac{3}{20} + \frac{4}{15} = ?$$

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**If the fractions have
different denominators we
have to expand these
fractions and find the same
denominator**

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Example

$$\frac{3}{20} + \frac{4}{15} = ?$$

We expand the first fraction by the denominator of the second fraction

$$\frac{3 \cdot 15}{20 \cdot 15} = \frac{45}{300}$$

We expand the second fraction by the denominator of the first fraction

$$\frac{4 \cdot 20}{15 \cdot 20} = \frac{80}{300}$$

The result is

$$\frac{3}{20} + \frac{4}{15} = \frac{45}{300} + \frac{80}{300} = \frac{125}{300}$$

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But it isn't the best way.

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A multiple of a whole number is the product of that number and any whole number.

Multiples of 3

3, 6, 9, 12

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The least common multiple of two or more whole numbers is the smallest whole number, other than zero, that they all divide into evenly.

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Example

$$\frac{3}{20} + \frac{4}{15} = ?$$

Multiples of 20: 20, 40, 60, 80

Multiples of 15: 15, 30, 45, 60, 75

**The least common multiple of 20
and 15 is 60**

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Example

$$\frac{3}{20} + \frac{4}{15} = ?$$

We expand the fractions to have the least common multiple of its denominators as the same denominator

$$\frac{3 \cdot 3}{20 \cdot 3} = \frac{9}{60} \qquad \frac{4 \cdot 4}{15 \cdot 4} = \frac{16}{60}$$

The result is

$$\frac{3}{20} + \frac{4}{15} = \frac{9}{60} + \frac{16}{60} = \frac{25}{60}$$

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**In the end we reduce the
result into
the lowest term**

$$\frac{25}{60} = \frac{5}{12}$$