A Fractions

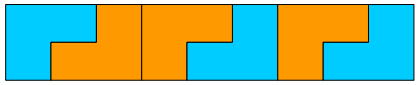
What fraction of the following shapes are blue?

Count the number of blue parts. That becomes the **numerator**.

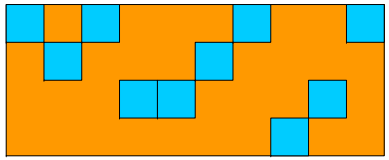
Count the **total** number of parts. That becomes the **denominator.**

1

2



3



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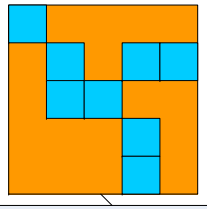

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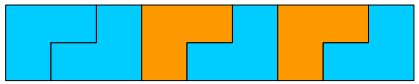

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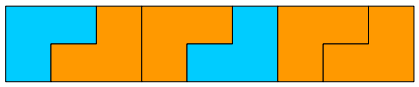

Sometimes, you might need to draw your own lines in.

$$\frac{7}{12}$$

Numerator

Vinculum

Denominator

B Convert fractions into decimals and percentages

$$\frac{7}{20} = 35\% = 0{\cdot}35$$

100 ÷ 20 = 5

To find the percentage, multiply the "5" by the numerator

To find the decimal, divide the percentage by 100

More complicated...

$$\frac{7}{12} \qquad 12\overline{)7{\cdot}0000} \quad 0{\cdot}583\dot{3}$$

1 $\frac{13}{20} =$

2 $\frac{4}{5} =$

3 $\frac{6}{10} =$

4 $\frac{17}{50} =$

5 $\frac{19}{20} =$

6 $\frac{2}{5} =$

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C Find fractions of amounts

Find $\frac{13}{20}$ of 65

"of" means times

Look for common factors to cancel down numbers and make life easier… 5 is one

$$\frac{13}{\cancel{20}_{4}} \times \frac{\cancel{65}^{13}}{1} = \frac{169}{4} = 42\frac{1}{4}$$

Top × top. Bottom × bottom.

169 ÷ 4 = 42 r 1 The remainder becomes the numerator

Find $\frac{19}{20}$ of 250

Find $\frac{7}{10}$ of 175

Find $\frac{29}{50}$ of 430

D Convert improper fractions into fractions

$$\frac{187}{20} = 9\frac{7}{20}$$

The remainder becomes the numerator

The denominator stays the same

Divide the numerator by the denominator. The integer part of this is the whole amount.

1 $\frac{148}{20} =$

2 $\frac{83}{16} =$

3 $\frac{67}{25} =$

4 $\frac{12}{9} =$

5 $\frac{26}{12} =$

6 $\frac{35}{25} =$

7 $\frac{27}{16} =$

8 $\frac{37}{15} =$

9 $\frac{23}{8} =$

E Addition and Subtraction of Fractions with Related Denominators

$$\frac{7}{12}+\frac{5}{6}+\frac{7}{24}=\frac{14}{24}+\frac{20}{24}+\frac{7}{24}=\frac{41}{24}=1\frac{17}{24}$$

These fractions are related because they are all factors of 24

24 ÷ 12 = 2 so we need to multiply top and bottom by 2.

24 ÷ 6 = 4 so we need to multiply top and bottom by 4.

Once all the denominators are the same, we can simply add the numerators and keep the denominators the same.

Divide the numerator by the denominator. The quotient becomes the whole number and the remainder, the numerator

1 $\frac{11}{18}+\frac{5}{9}=$

2 $\frac{7}{16}+\frac{27}{64}=$

3 $\frac{7}{8}+\frac{3}{4}=$

4 $\frac{2}{3}+\frac{5}{9}=$

5 $\frac{16}{32}+\frac{27}{64}=$

6 $\frac{5}{8}+\frac{1}{4}=$

F Addition and Subtraction of Fractions with Unrelated Denominators

$$\frac{11}{12}+\frac{5}{7}=\frac{(11\times7)+(12\times5)}{(12\times7)}=\frac{77+60}{84}=\frac{137}{84}=1\frac{53}{84}$$

Remember this shape: it tells you what to multiply

1 $\frac{7}{12}+\frac{5}{11}=$

2 $\frac{5}{9}+\frac{3}{4}=$

3 $\frac{2}{7}+\frac{3}{9}=$

4 $\frac{6}{11}-\frac{4}{13}=$

5 $\frac{11}{12}-\frac{3}{8}=$

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G Multiplication of Fractions

$$\frac{\cancel{15}^{3}}{\cancel{24}_{4}}\times\frac{\cancel{6}^{1}}{\cancel{25}_{5}}=\frac{3}{4}\times\frac{1}{5}=\frac{3}{20}$$

See if you can cancel the numbers first. Something from the numerators cancels with something from the denominators. You CAN'T cancel denominator with denominator or numerator with numerator.

Multiply top times top. Bottom times bottom.

When you multiply by a fraction, your answer is often smaller than what you began with

1 $\frac{8}{20}\times\frac{6}{12}=$

2 $\frac{18}{15}\times\frac{7}{36}=$

3 $\frac{7}{20}\times\frac{15}{21}=$

4 $\frac{18}{28}\times\frac{7}{24}=$

5 $\frac{6}{10}\times\frac{6}{12}=$

6 $\frac{11}{15}\times\frac{30}{66}=$

7 $\frac{25}{44}\times\frac{22}{24}\times\frac{36}{39}=$

81 $\frac{18}{55}\times\frac{45}{64}\times\frac{36}{81}\times\frac{48}{52}=$

H Division of Fractions

$$\frac{7}{20}\div\frac{5}{12}=\frac{7}{\cancel{20}_{5}}\times\frac{\cancel{12}^{3}}{5}=\frac{7}{5}\times\frac{3}{5}=\frac{21}{25}$$

Keep the first fraction
Change the ÷ to a ×
Flip the last fraction

Once you have got to the multiplication, you can cancel down.

Top times top
Bottom times bottom

When you divide by a fraction, your answer is often larger than what you began with

1 $\frac{18}{21}\div\frac{27}{35}=$

2 $\frac{15}{48}\div\frac{25}{36}=$

3 $\frac{6}{11}\div\frac{7}{12}=$

4 $\frac{16}{27}\div\frac{17}{36}=$

5 $\frac{15}{48}\div\frac{15}{24}=$