Multiplication and Division of Fractions

The red pages explain how to do the sums. You need to read them carefully.

Multiplication of fractions

- When multiplying fractions the fractions do NOT have to be the same name

- We simply multiply the top by the top and the bottom by the bottom

- $\frac{3}{4}\ x\ \frac{1}{2} = \frac{3}{8}$ $\qquad$ $\frac{5}{6}\ x\ \frac{2}{3} = \frac{10}{18} = \frac{5}{9}$

Now try these sums

- $\frac{1}{2} x \frac{1}{3} =$ $\frac{1}{4} x \frac{1}{3} =$ $\frac{1}{3} x \frac{1}{5} =$
- $\frac{1}{2} x \frac{1}{5} =$ $\frac{3}{4} x \frac{1}{2} =$ $\frac{1}{5} x \frac{2}{3} =$
- $\frac{3}{4} x \frac{1}{4} =$ $\frac{2}{5} x \frac{1}{3} =$ $\frac{7}{10} x \frac{1}{2} =$
- $\frac{3}{7} x \frac{2}{5} =$ $\frac{1}{8} x \frac{3}{5} =$ $\frac{3}{10} x \frac{3}{4} =$

Now check your answers

- $\frac{1}{2} x \frac{1}{3} = \frac{1}{6}$ $\frac{1}{4} x \frac{1}{3} = \frac{1}{12}$ $\frac{1}{3} x \frac{1}{5} = \frac{1}{15}$
- $\frac{1}{2} x \frac{1}{5} = \frac{1}{10}$ $\frac{3}{4} x \frac{1}{2} = \frac{3}{8}$ $\frac{1}{5} x \frac{2}{3} = \frac{2}{15}$
- $\frac{3}{4} x \frac{1}{4} = \frac{3}{16}$ $\frac{2}{5} x \frac{1}{3} = \frac{2}{15}$ $\frac{7}{10} x \frac{1}{2} = \frac{7}{20}$
- $\frac{3}{7} x \frac{2}{5} = \frac{6}{35}$ $\frac{1}{8} x \frac{3}{5} = \frac{3}{40}$ $\frac{3}{10} x \frac{3}{4} = \frac{9}{40}$

More multiplication of fractions

- Sometimes the sum might be written with the word ‘of’ instead of the X sign

- $\frac{1}{3}\ of\ \frac{1}{2}$ We do this exactly the same way

- $\frac{1}{3}\ of\ \frac{1}{2} = \frac{1}{6}$ (Multiply the top by the top and the bottom by the bottom)

More Multiplication

- $\frac{1}{2}\ of\ \frac{1}{2} =$ $\frac{1}{2}\ of\ \frac{1}{4} =$ $\frac{1}{2}\ of\ \frac{1}{3} =$
- $\frac{1}{3}\ of\ \frac{1}{3} =$ $\frac{1}{3}\ of\ \frac{1}{4} =$ $\frac{1}{3}\ of\ \frac{1}{5} =$
- $\frac{2}{3}\ of\ \frac{1}{4} =$ $\frac{2}{3}\ of\ \frac{3}{4} =$ $\frac{3}{4}\ of\ \frac{5}{6} =$
- $\frac{1}{3}\ of\ \frac{3}{8} =$ $\frac{2}{3}\ of\ \frac{1}{5} =$ $\frac{2}{3}\ of\ \frac{1}{2} =$

Now check your answers

- $\frac{1}{2}\ of\ \frac{1}{2} = \frac{1}{4}$ $\frac{1}{2}\ of\ \frac{1}{4} = \frac{1}{8}$ $\frac{1}{2}\ of\ \frac{1}{3} = \frac{1}{6}$
- $\frac{1}{3}\ of\ \frac{1}{3} = \frac{1}{9}$ $\frac{1}{3}\ of\ \frac{1}{4} = \frac{1}{12}$ $\frac{1}{3}\ of\ \frac{1}{5} = \frac{1}{15}$
- $\frac{2}{3}\ of\ \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$ $\frac{2}{3}\ of\ \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$ $\frac{3}{4}\ of\ \frac{5}{6} = \frac{15}{24}$
- $\frac{1}{3}\ of\ \frac{3}{8} = \frac{3}{24} = \frac{1}{8}$ $\frac{2}{3}\ of\ \frac{1}{5} = \frac{2}{15}$ $\frac{2}{3}\ of\ \frac{1}{2} = \frac{2}{6} = \frac{1}{3}$

Multiplying a whole number by a fraction

- Example
- $4\ x\ \frac{1}{2}$
- We must change the whole number to a fraction
- $4 = \frac{4}{1}$
- So our sum needs to be written as
- $\frac{4}{1}\ \ x\ \frac{1}{2}\ = \frac{4}{2} = 2$

A couple more examples

- $5 \, x \frac{1}{3} \quad = \frac{5}{1} \; x \frac{1}{3} \quad = \; \frac{5}{3} \; = 1 \frac{2}{3}$

- $\frac{2}{3} \; x \; 6 \quad = \; \frac{2}{3} \; x \frac{6}{1} \quad = \frac{12}{3} \quad = 4$

Now try these sums

- $\frac{1}{2}\ x\ 7 =$ $\frac{2}{3}\ x\ 5 =$ $\frac{3}{4}\ x\ 4 =$
- $8\ x\ \frac{3}{6} =$ $4\ x\ \frac{5}{6} =$ $3\ x\ \frac{3}{5} =$
- $\frac{5}{9}\ x\ 8 =$ $\frac{9}{10}\ x\ 6 =$ $4\ x\ \frac{5}{6} =$
- $\frac{1}{3}\ x\ 10 =$ $5\ x\ \frac{3}{4} =$ $2\ x\ \frac{2}{3} =$

Now check your answers –tidy the improper fractions

- $\frac{1}{2}\ x\ 7 = \frac{14}{2}$ $\frac{2}{3}\ x\ 5 = \frac{10}{3}$ $\frac{3}{4}\ x\ 4 = \frac{12}{4}$
- $8\ x \frac{3}{6} = \frac{24}{6}$ $4\ x \frac{5}{6} = \frac{20}{6}$ $3\ x \frac{3}{5} = \frac{15}{5}$
- $\frac{5}{9} x\ 8 = \frac{40}{9}$ $\frac{9}{10}\ x\ 6 = \frac{54}{10}$ $4\ x \frac{5}{6} = \frac{20}{6}$
- $\frac{1}{3}\ x\ 10 = \frac{10}{3}$ $5\ x \frac{3}{4} = \frac{15}{4}$ $2\ x \frac{2}{3} = \frac{4}{3}$

Now try these problems

- A ruler is $\frac{3}{10}m$ long – how long are 7 rulers?
- An orange weighs about $\frac{1}{3}\ kg$. Find the total weight of 8 oranges?
- Tom spends $\frac{3}{4}\ hour$ each day – Monday to Friday on homework. How long does he spend in a week?
- A cat is about $\frac{1}{3}m$ tall. An elephant is about 11 times taller. How tall is an elephant?

Now check your answers

- Ruler = $\frac{3}{10}\ x\ 7 = \frac{3}{10} x \frac{7}{1} = \frac{21}{10} = 2\ \frac{1}{10} m$
- Oranges = $\frac{1}{3}\ x\ 8 = \frac{1}{3}\ x \frac{8}{1} = \frac{8}{3} = 2\frac{2}{3} kg$
- Homework = $\frac{3}{4}\ x\ 5 = \frac{3}{4} x \frac{5}{1} = \frac{15}{4} = 3\frac{3}{4} hrs$
- Elephant = $\frac{1}{3}\ x\ 11 = \frac{1}{3}\ x \frac{11}{1} = \frac{11}{3} = 3\frac{2}{3}\ m$

Division of decimals

- $12 \div \frac{1}{2} =$
- Think of the 12 as pizzas. How many $\frac{1}{2}s$ are in 12 pizzas?
- If you draw 12 circles and half them all you will see there are 24.

- $8 \div \frac{1}{4} = 32$
- Draw 8 pizzas and divide them into ¼ s – you will see that you have 32 slices

Now try these

- $4 \div \frac{1}{5} =$ $6 \div \frac{1}{4} =$ $9 \div \frac{1}{3} =$
- $3 \div \frac{1}{6} =$ $6 \div \frac{1}{8} =$ $8 \div \frac{1}{4} =$
- $3 \div \frac{1}{10} =$ $5 \div \frac{1}{9} =$ $6 \div \frac{1}{5} =$
- $4 \div \frac{1}{2} =$ $6 \div \frac{1}{3} =$ $4 \div \frac{1}{3} =$

Now check your answers – tidy the improper fraction

- $4 \div \frac{1}{5} = 20$ $\quad 6 \div \frac{1}{4} = 24$ $\quad 9 \div \frac{1}{3} = 27$
- $3 \div \frac{1}{6} = 18$ $\quad 6 \div \frac{1}{8} = 48$ $\quad 8 \div \frac{1}{4} = 32$
- $3 \div \frac{1}{10} = 30$ $\quad 5 \div \frac{1}{9} = 45$ $\quad 6 \div \frac{1}{5} = 30$
- $4 \div \frac{1}{2} = 8$ $\quad 6 \div \frac{1}{3} = 18$ $\quad 4 \div \frac{1}{3} = 12$

Now try these

- At Tom's party there were 4 pizzas. Each child got $\frac{1}{4}$ of a pizza. How many children were at the party?

- The teacher divided 6 bars of chocolate between the class. Each child got $\frac{1}{3}$. How many children were in the class?

- At a birthday party 6 cakes were shared. If everyone got $\frac{1}{5}$ of a cake how many people were at the party?

- 8 pizzas were shared at a party. Each person got $\frac{1}{3}$ of a pizza. How many people were at the party?

- At Tom's party there were 4 pizzas. Each child got $\frac{1}{4}$ of a pizza. How many children were at the party? Ans = 16

- The teacher divided 6 bars of chocolate between the class. Each child got $\frac{1}{3}$. How many children were in the class?
- Answer = 18 children

- At a birthday party 6 cakes were shared. If everyone got $\frac{1}{5}$ of a cake how many people were at the party? Answer = 30 people

- 8 pizzas were shared at a party. Each person got $\frac{1}{3}$ of a pizza. How many people were at the party? Answer = 24 children

Well done

- Remember you can always go back over this power point to remind yourself how to multiply and divide fractions.