

What do I need to be able to do?

You should be able to:

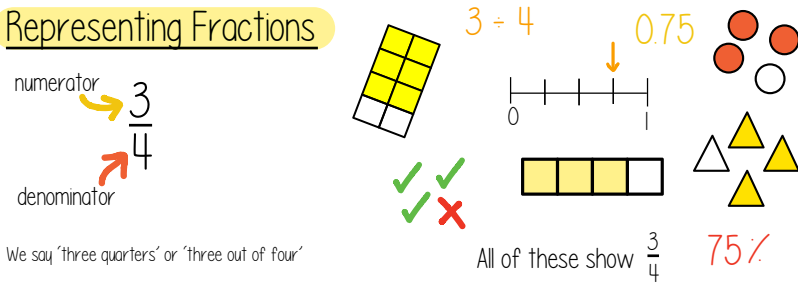
- Understand different representations of fractions
- Fully simplify fractions
- Recognise and find equivalent fractions
- Convert between mixed numbers and improper fractions
- Add/subtract any fractions
- Add/subtract mixed numbers

FRACTIONS

Key Words

- Numerator: the top number of a fraction
- Denominator: the bottom number of a fraction
- Equivalent: of equal value
- Mixed Number: a number with an integer and a proper fraction
- Improper Fraction: a fraction where the numerator is larger than the denominator
- Coprime: two numbers which share no common factors (except 1)

Representing Fractions



Equivalent Fractions

Two fractions are equivalent if they represent the same quantity

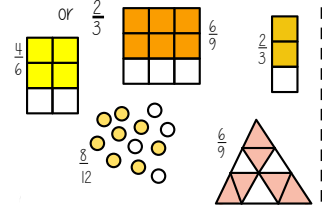
If the numerator and denominator have the same multiplier, they are equivalent

$$\frac{5}{7} \xrightarrow{\times 5} \frac{25}{35}$$

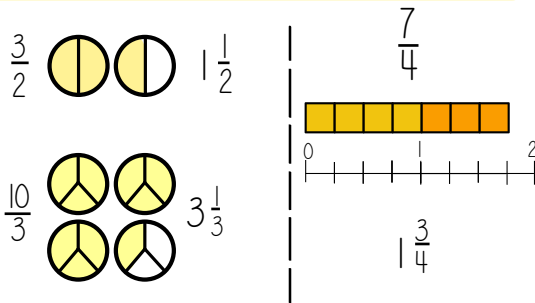
$$\frac{1}{4} \xrightarrow{\times 2} \frac{2}{8}$$

Each of these diagrams represents an equivalent amount.

They all show '2 out of every 3'



Mixed Numbers and Improper Fractions



Fractions can represent more than one whole.

The denominator tells us how many parts make up one whole

$\frac{9}{5}$ This tells us that one whole is made up of 5 parts. We have 9 parts, so we can make one whole plus 4 parts

$1\frac{4}{5}$

Simplifying Fractions

You must always simplify your fractions if you can

$$\frac{2}{4} \xrightarrow{-2} \frac{1}{2}$$

$$\frac{4}{12} \xrightarrow{-2} \frac{2}{6} \xrightarrow{-2} \frac{1}{3}$$

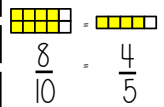
$$\frac{4}{12} \xrightarrow{-12} \frac{1}{3}$$

HCF of 2 and 4 is 2 so to fully simplify the fraction by dividing the numerator and denominator by 2

Both ways get us to the right answer, just one takes a bit longer!

$$\frac{8}{10} \xrightarrow{-2} \frac{4}{5}$$

Sometimes a picture can help to visualise the problem



Once you cannot find a common factor, the fraction is fully simplified

$\frac{7}{10}$ This fraction is fully simplified as 7 and 10 have no common factors. We can say that 7 and 10 are CO-PRIME

Adding/Subtracting Fractions

Common denominators

$$\frac{2}{7} + \frac{4}{7} = \frac{6}{7}$$

Remember that the denominator doesn't change

$$\frac{5}{8} - \frac{4}{8} = \frac{1}{8}$$

We can just subtract 4 from 5!

$$\frac{1}{10} + \frac{3}{10} = \frac{4}{10}$$

4 and 10 have a common factor (2)

$$\frac{4}{10} \xrightarrow{\div 2} \frac{2}{5}$$

You must always fully simplify your fractions

Adding/Subtracting Fractions

Common multiples

$$\frac{3}{5} + \frac{1}{10}$$

10 is a multiple of 5 (5 x 2) so, using equivalent fractions we can say: $\frac{3}{5} = \frac{6}{10}$

$$\frac{6}{10} + \frac{1}{10} = \frac{7}{10}$$

$$\frac{3}{4} - \frac{1}{12}$$

12 is a multiple of 4 (4 x 3) so, using equivalent fractions we can say: $\frac{3}{4} = \frac{9}{12}$

$$\frac{9}{12} - \frac{1}{12} = \frac{8}{12}$$

$$\frac{8}{12} \xrightarrow{\div 4} \frac{2}{3}$$

Remember you must always fully simplify your fractions!

$$\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$$

Here, we know that 2 and 3 share a common multiple of 6, so we can say: $\frac{1}{2} = \frac{3}{6}$ and $\frac{2}{3} = \frac{4}{6}$

$$\frac{3}{6} + \frac{4}{6} + \frac{1}{6} = \frac{8}{6}$$

We need to give our answer as a mixed number

$$\frac{8}{6} = 1\frac{2}{3}$$

Simplify

Adding/Subtracting Fractions

Different denominators

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

We need to find a common denominator using equivalent fractions

$$\frac{1}{5} \xrightarrow{\times 4} \frac{4}{20}$$

$$\frac{3}{4} \xrightarrow{\times 5} \frac{15}{20}$$

$$\frac{4}{20} + \frac{15}{20} = \frac{19}{20}$$

$$\frac{3}{11} + \frac{2}{3} = \frac{9}{33} + \frac{22}{33} = \frac{31}{33}$$

the LCM of 3 and 11 is 33, so our equivalent fractions are:

$$\frac{3}{11} = \frac{9}{33}$$

$$\frac{2}{3} = \frac{22}{33}$$

$$\frac{5}{7} + \frac{4}{9} = \frac{45}{63} + \frac{28}{63} = \frac{73}{63}$$

Remember you can find the LCM of 7 and 9 by listing their multiples: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98, 105, 112, 119, 126, 133, 140, 147, 154, 161, 168, 175, 182, 189, 196, 203, 210, 217, 224, 231, 238, 245, 252, 259, 266, 273, 280, 287, 294, 301, 308, 315, 322, 329, 336, 343, 350, 357, 364, 371, 378, 385, 392, 399, 406, 413, 420, 427, 434, 441, 448, 455, 462, 469, 476, 483, 490, 497, 504, 511, 518, 525, 532, 539, 546, 553, 560, 567, 574, 581, 588, 595, 602, 609, 616, 623, 630, 637, 644, 651, 658, 665, 672, 679, 686, 693, 700, 707, 714, 721, 728, 735, 742, 749, 756, 763, 770, 777, 784, 791, 798, 805, 812, 819, 826, 833, 840, 847, 854, 861, 868, 875, 882, 889, 896, 903, 910, 917, 924, 931, 938, 945, 952, 959, 966, 973, 980, 987, 994, 1001, 1008, 1015, 1022, 1029, 1036, 1043, 1050, 1057, 1064, 1071, 1078, 1085, 1092, 1099, 1106, 1113, 1120, 1127, 1134, 1141, 1148, 1155, 1162, 1169, 1176, 1183, 1190, 1197, 1204, 1211, 1218, 1225, 1232, 1239, 1246, 1253, 1260, 1267, 1274, 1281, 1288, 1295, 1302, 1309, 1316, 1323, 1330, 1337, 1344, 1351, 1358, 1365, 1372, 1379, 1386, 1393, 1400, 1407, 1414, 1421, 1428, 1435, 1442, 1449, 1456, 1463, 1470, 1477, 1484, 1491, 1498, 1505, 1512, 1519, 1526, 1533, 1540, 1547, 1554, 1561, 1568, 1575, 1582, 1589, 1596, 1603, 1610, 1617, 1624, 1631, 1638, 1645, 1652, 1659, 1666, 1673, 1680, 1687, 1694, 1701, 1708, 1715, 1722, 1729, 1736, 1743, 1750, 1757, 1764, 1771, 1778, 1785, 1792, 1799, 1806, 1813, 1820, 1827, 1834, 1841, 1848, 1855, 1862, 1869, 1876, 1883, 1890, 1897, 1904, 1911, 1918, 1925, 1932, 1939, 1946, 1953, 1960, 1967, 1974, 1981, 1988, 1995, 2002, 2009, 2016, 2023, 2030, 2037, 2044, 2051, 2058, 2065, 2072, 2079, 2086, 2093, 2100, 2107, 2114, 2121, 2128, 2135, 2142, 2149, 2156, 2163, 2170, 2177, 2184, 2191, 2198, 2205, 2212, 2219, 2226, 2233, 2240, 2247, 2254, 2261, 2268, 2275, 2282, 2289, 2296, 2303, 2310, 2317, 2324, 2331, 2338, 2345, 2352, 2359, 2366, 2373, 2380, 2387, 2394, 2401, 2408, 2415, 2422, 2429, 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