

Level 4: Fractions

1) In Level 3 we learned: -

How to simplify fractions, for example: -

$$\frac{21}{28} = \frac{3}{4} \quad (\text{top and bottom divided by } 7)$$

$$\frac{48}{64} = \frac{24}{32} = \frac{12}{16} = \frac{6}{8} = \frac{3}{4} \quad (\text{other quicker methods possible e.g. divide by } 8)$$

How to add and subtract fractions, simplifying when necessary, for example:-

$$\frac{3}{4} + \frac{1}{5} = \frac{15}{20} + \frac{4}{20} = \frac{19}{20}$$

$$\frac{1}{2} - \frac{3}{10} = \frac{5}{10} - \frac{3}{10} = \frac{2}{10}$$

Alternative “Kiss-and-smile” approach

$$\frac{3}{4} \text{ * } \frac{1}{5} = \frac{3 \times 5 + 4 \times 1}{4 \times 5} = \frac{15 + 4}{20} = \frac{19}{20}$$

$$\frac{1}{2} \text{ / } \frac{3}{10} = \frac{1 \times 10 - 3 \times 2}{2 \times 10} = \frac{10 - 6}{20} = \frac{4}{20} = \frac{1}{5}$$

How to convert mixed numbers into top-heavy (improper) fractions, for example: -

$$\frac{22}{5} = 4 \frac{2}{5} \quad (22 \div 5 = 4 \text{ remainder } 2)$$

How to convert top-heavy (improper) fractions into mixed numbers, for example: -

$$3 \frac{2}{7} = \frac{23}{7} \quad (3 \times 7 + 2 = 23)$$

2) In Level 4 we will learn how to multiply fractions, for example: -

$$\frac{2}{3} \times \frac{5}{7} = \frac{2 \times 5}{3 \times 7} = \frac{10}{21}$$

$$\frac{3}{4} \times \frac{7}{9} = \frac{3 \times 7}{4 \times 9} = \frac{21}{36} = \frac{7}{12} \text{ Remember to simplify your answer if possible}$$

Alternatively, you can simplify before multiplying:-

$$\frac{\cancel{3}^1}{4} \times \frac{7}{\cancel{9}_3} = \frac{1 \times 7}{4 \times 3} = \frac{7}{12}$$

3) In Level 4 we will also learn how to divide fractions, for example: -

$$\frac{3}{7} \div \frac{4}{5} = \frac{3}{7} \times \frac{5}{4} = \frac{15}{28}$$

$$\frac{5}{8} \div \frac{3}{4} = \frac{5}{8} \times \frac{4}{3} = \frac{20}{24} = \frac{5}{6}$$

4) In Level 4 we will learn how to add, subtract, multiply or divide mixed numbers, for example: -

$$1\frac{1}{2} + 2\frac{1}{3} = \frac{3}{2} + \frac{7}{3} = \frac{9+14}{6} = \frac{23}{6} = 3\frac{5}{6}$$

$$1\frac{3}{4} - 1\frac{1}{5} = \frac{7}{4} - \frac{6}{5} = \frac{35-24}{20} = \frac{11}{20}$$

$$2\frac{1}{2} \times 1\frac{2}{3} = \frac{5}{2} \times \frac{5}{3} = \frac{25}{6} = 4\frac{1}{6}$$

$$3\frac{1}{4} \div 1\frac{1}{3} = \frac{13}{4} \div \frac{4}{3} = \frac{13}{4} \times \frac{3}{4} = \frac{39}{16} = 2\frac{7}{16}$$

Notice the steps are the same in all cases:-

- 1) Change the mixed numbers to top-heavy (improper) fractions.
- 2) Add, subtract, multiply or divide as appropriate.
- 3) If necessary simplify your answer and/or change it back to a mixed number.

6) Solve problems by multiplying or dividing fractions.

- a) How many pieces of pipe $\frac{9}{16}$ of an inch long can be cut from a piece of pipe which is $2\frac{1}{2}$ inches long?
- b) Ten sheets of plywood $\frac{3}{8}$ of an inch are stacked on top of each other. Is this stack more than four inches high? Explain your answer.
- c) John runs for $1\frac{1}{4}$ hours at an average speed of $7\frac{2}{5}$ miles per hour. How many miles does he run?

**REMEMBER TO SHOW ALL YOUR WORKING
AND EXPLAIN YOUR ANSWER FULLY!**