

Be Wizard At Maths



**I don't usually make jokes about fractions...
...but I will make one if I halve two.**

2.1 Lowest Common Multiple

The multiples of 6 are the numbers that are in the 6 times table.

$$1 \times 6 = 6$$

$$2 \times 6 = 12$$

$$3 \times 6 = 18$$

$$4 \times 6 = 24$$

$$5 \times 6 = 30$$

$$6 \times 6 = 42$$

$$7 \times 6 = 48$$

$$\dots \times \dots = \dots$$

$$\{\text{Multiples of 6}\} = \{ 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, \dots \}$$

The multiples of 15 are the numbers that are in the 15 times table.

$$1 \times 15 = 15$$

$$2 \times 15 = 30$$

$$3 \times 15 = 45$$

$$\dots \times \dots = \dots$$

$$\{\text{Multiples of 15}\} = \{15, 30, 45, \dots\}$$

The **lowest common multiple** of 6 and 15 is the first integer that is in the 6 times table and also in the 15 times table

$$lcm \{6,15\} = 30$$

This is the key to adding awkward fractions which have awkward denominators.

For example, $\frac{1}{6} + \frac{4}{15}$

The trick is to work out the **lowest common multiple** of the denominators and then use the multiplying by 1 technique on **both** pieces of the fraction sum.

$$\begin{aligned} \frac{1}{6} + \frac{4}{15} &= \frac{1}{6} \times \mathbf{1} + \frac{4}{15} \times \mathbf{1} && \text{Step 1: Multiply by 1} \\ &= \frac{1}{6} \times \frac{\mathbf{5}}{\mathbf{5}} + \frac{4}{15} \times \frac{\mathbf{2}}{\mathbf{2}} && \text{Step 2: Use } lcm\{6,15\} \text{ is } 30 \\ &= \frac{5}{30} + \frac{8}{30} && \text{Step 3: Do the two multiplications} \\ &= \frac{13}{30} && \text{Step 4: Do the easy addition} \end{aligned}$$

The **lowest common multiple** when used in this way is often called the **lowest common denominator**

2.2 Exercise

Marks Available : 40

Question 1

- (i) List the first six multiples of 8 [1 mark]
- (ii) List the first six multiples of 12 [1 mark]
- (iii) What is $lcm\{8,12\}$? [1 mark]
- (iv) Showing all the steps, work out $\frac{3}{8} + \frac{5}{12}$ [7 marks]

[7 marks]

Question 2

- (i) List the first six multiples of 10 [1 mark]
- (ii) List the first six multiples of 25 [1 mark]
- (iii) What is $lcm\{10,25\}$? [1 mark]
- (iv) Showing all the steps, work out $\frac{3}{10} + \frac{7}{25}$

[7 marks]

Question 3

- (i) List the first ten multiples of 9 [1 mark]
- (ii) List the first six multiples of 24 [1 mark]
- (iii) What is $lcm\{9,24\}$? [1 mark]
- (iv) Showing all the steps, work out $\frac{2}{9} + \frac{7}{24}$

[7 marks]

Question 4

(i) List the first eight multiples of 12

[1 mark]

(ii) List the first eight multiples of 14

[1 mark]

(iii) What is $lcm\{12,14\}$?

[1 mark]

(iv) Showing all the steps, work out $\frac{5}{12} - \frac{1}{14}$

[7 marks]



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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk