Lesson 3

Ratio : GCSE

Non - Calculator Throughout

3.1 Cunning Cancelling

Example

The king is in his counting house, counting up his money.
He has 32 bags each containing 25 gold coins.
And 20 bags each containing 80 silver coins.
What is the ratio of the number of gold coins to the number of silver coins ?

gold : *silver*	
$32 \times 25 : 20 \times 80$	*divide* 25 *and* 20 *by* 5
$32 \times 5 : 4 \times 80$	*divide* 32 *and* 4 *by* 4
$8 \times 5 : 1 \times 80$	*divide* 8 *and* 80 *by* 8
$1 \times 5 : 1 \times 10$	*divide* 5 *and* 10 *by* 5
$1 \times 1 : 1 \times 2$	
$1 : 2$	

3.2 You Try

Try cancelling down the following ratio (The answer's over the page)

$$27 \times 55 : 9 \times 22$$

3.3 You Try Answer

$$27 \times 55 : 9 \times 22$$

$$3 \times 55 : 1 \times 22 \qquad \textit{divide the } 27 \textit{ and } 9 \textit{ by } 9$$

$$3 \times 5 : 1 \times 2 \qquad \textit{divide the } 55 \textit{ and } 22 \textit{ by } 11$$

$$15 : 2$$

3.4 Exercise

Question 1

Cancel down the following ratios as far as possible by removing common factors

(i) $4 \times 21 : 8 \times 35$

(ii) $12 \times 25 : 9 \times 35$

(iii) $20 \times 21 : 25 \times 27$

(iv) $16 \times 25 : 12 \times 15$

(v) $35 \times 18 : 25 \times 27$

(vi) $49 \times 45 : 36 \times 14$

(vii) $20 \times 21 : 16 \times 49$

(viii) $55 \times 75 : 44 \times 63$

Question 2
For a BBQ, John buys 16 packets of sausages, each containing 24 sausages.
He also buys, 14 packets of burgers, each containing 8 burgers.
State the ratio of

$$sausages \ : \ burgers$$

Question 3
For a children's party, Kate buys 22 packets of balloons, each containing 6 balloons.
She also buys 44 packets of 9 party poppers.
State the ratio of

$$balloons \ : \ party\ poppers$$

Question 4
To celebrate Bonfire night, Henry buys 15 packets of 16 sparklers and 12 packets of 10 'bangers'. State the ratio of

$$sparklers \ : \ bangers$$

Question 5
For a fruit salad at a party, Emily buys 12 packets of 9 apples, 6 boxes of 14 oranges and 9 packets of 4 kiwi fruit.
State the ratio of

$$apples \ : \ oranges \ : \ kiwi\ fruit$$

Question 6

The numbers 13860 and 54450 can be written as products of primes;

$$13860 = 2 \times 2 \times 3 \times 3 \times 5 \times 7 \times 11$$

and

$$54450 = 2 \times 3 \times 3 \times 5 \times 5 \times 11 \times 11$$

Use this fact to cancel down the ratio

$$13860 \ : \ 54450$$

by looking for cancellations in

$$2 \times 2 \times 3 \times 3 \times 5 \times 7 \times 11 \ : \ 2 \times 3 \times 3 \times 5 \times 5 \times 11 \times 11$$

Question 7

The numbers 9954945 and 6636630 can be written as products of primes;

$$9954945 = 3 \times 3 \times 5 \times 7 \times 11 \times 13 \times 13 \times 17$$

and

$$6636630 = 2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 13 \times 17$$

Use this fact to cancel down the ratio

$$9954945 \ : \ 6636630$$

by looking for cancellations in

$$3 \times 3 \times 5 \times 7 \times 11 \times 13 \times 13 \times 17 \ : \ 2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 13 \times 17$$

Question 8

In a Physics test, the scores of the twenty pupils in the class where

47	66	45	81	23	39	64	55	61	48
72	37	47	53	38	91	49	46	38	57

To pass the test a score of 40% or more was required.

State the ratio of

$$pass \ : \ fail$$

Question 9

A ***Passion Colada*** mocktail (an alcohol free cocktail) is made from

- ◇ 150 ml of pineapple juice
- ◇ 50 ml of almond syrup
- ◇ 200 ml of coconut milk

State the simplified ratio of

$$pineapple\ juice \ : \ almond\ syrup \ : \ coconut\ milk$$

Question 10

In Cambridge the average person earns £24,000
The average house in Cambridge costs £480,000
Determine the house price to earnings ratio for Cambridge

$$average\ house\ price \ : \ average\ earning$$