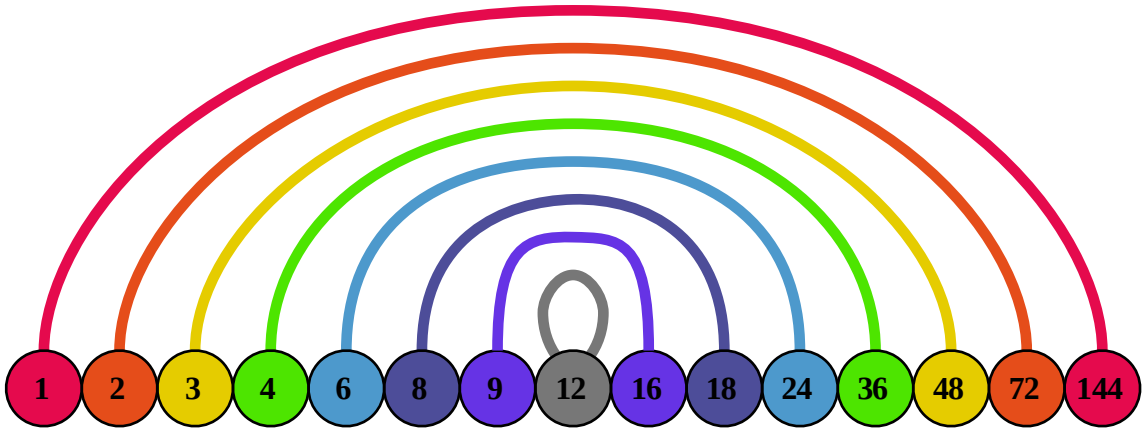
Lesson 4

Year 6, Primary 6, Mathematics
Vulgar Fractions

Factor Rainbows



It's all about Hue

4.1 The factors of a number

The factors of a given number are all of the numbers that divide into it with zero remainder. The diagram shows the fifteen factors of 144.

As a list they are,

{Factors of 144} = {1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 36, 48, 72, 144}

Notice that the factors come in ***product pairs*** except the 12 in the middle.
(The word ***product*** means ***multiplication***)

The **product pairs** are,

$1 \times 144 = 144$ {1,144}

$2 \times 72 = 144$ {2,72}

$3 \times 48 = 144$ {3,48}

$4 \times 36 = 144$ {4,36}

$6 \times 24 = 144$ {6,24}

$8 \times 18 = 144$ [8,18}

$9 \times 16 = 144$ {9,16}

$12 \times 12 = 144$ {12}

The fact that each pair multiplies to give the 144 is a terrific help in not missing out any of the factors. Drawing the rainbow is a visual aid to remember this fact.

Question : Why is 5 NOT a factor of 144 ?

Answer #1 :

5 is not a factor of 144 because 144 does not divide by 5 exactly, there is a remainder. This can be shown by bus stop division.

$$\frac{144}{5} \Rightarrow 5\overline{)1\ 4\ 4} \Rightarrow \begin{array}{r} 0\ \ 2\ \ 8\ \ r\ \ 4 \\ 5\overline{)1\ {}^{1}4\ {}^{4}4} \end{array} \Rightarrow 28 + \frac{4}{5}$$

$$\frac{144}{5} = 28\frac{4}{5}$$

Answer #2 :

There is an alternative “clever” answer for this particular example.

Numbers that divide by 5 exactly end in a 0 or a 5.

As 144 ends in a 4 it does not divide by 5 exactly so 5 is not a factor of 144.

4.2 Exercise

Marks available : 40

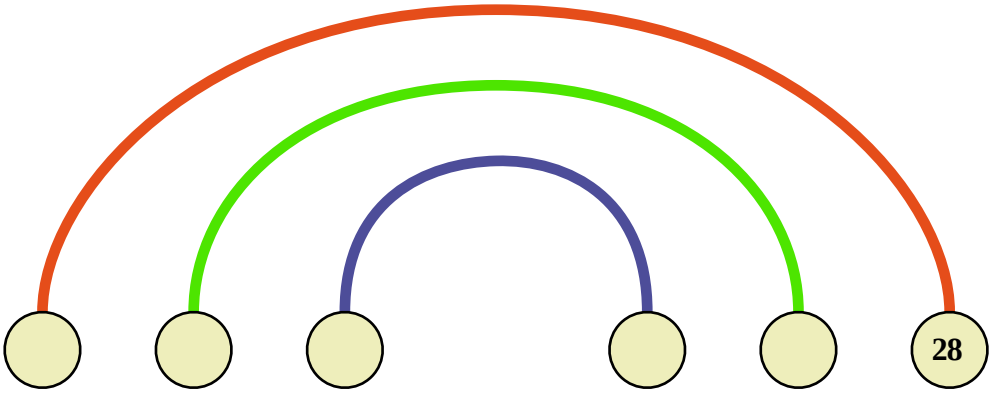
Question 1

Use bus stop division to show that 7 is not a factor of 144

[2 marks]

Question 2

(i) Complete the factor rainbow for 28



[2 marks]

(ii) Write in a list, all the factors of 28

[1 mark]

(iii) Use bus stop division to show that 3 is not a factor of 28

[2 marks]

Question 3

(i) Use bus stop division to show that 7 is not a factor of 75

[2 marks]

(ii) Without using bus stop division explain why 2 is not a factor of 75

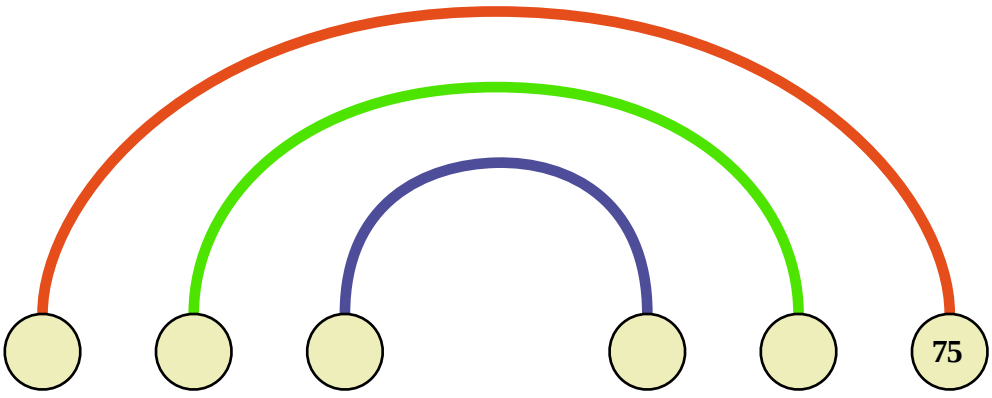
[2 marks]

(iii) As 2 is not a factor of 75, 4 is also not a factor of 75.
This is because 2 is a factor of 4.
(So if 4 was a factor so would be 2)
In fact, because 2 is not a factor, none of the following can be either;
{2, 4, 6, 8, 10, 12, 14, ...}

Write down a list of numbers that cannot be factors of 75 because of part (i) where you showed that 7 is not a factor.

[2 marks]

(iv) Complete the factor rainbow for 75



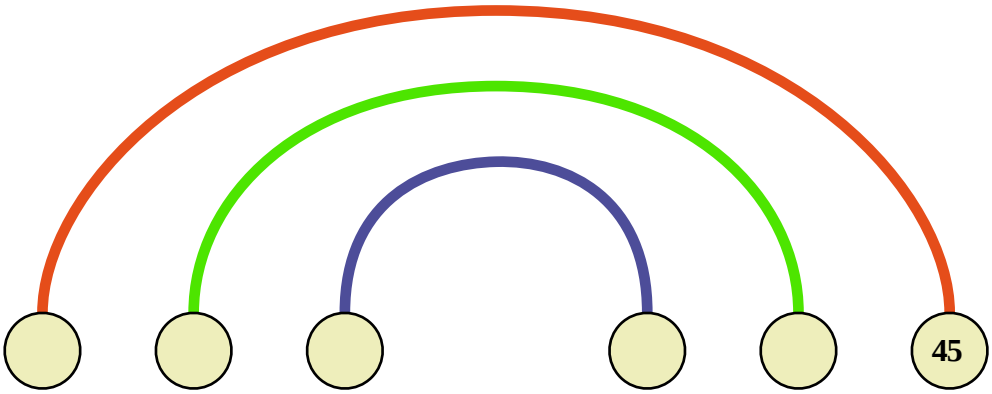
[2 marks]

(v) Write in a list, all the factors of 75

[1 mark]

Question 4

(i) Complete the factor rainbow for 45



[4 marks]

(ii) List all the factors of 45

[1 mark]

Question 5

(i) Without using bus stop division explain why 5 is not a factor of 56

[2 marks]

(ii) As 5 is not a factor of 56, list some related numbers also not factors.

[2 marks]

(iii) Without using bus stop division explain why 3 is not a factor of 56

[2 marks]

(iv) As 3 is not a factor of 56, list some related numbers also not factors.

[2 marks]

(v) Complete the factor rainbow for 56

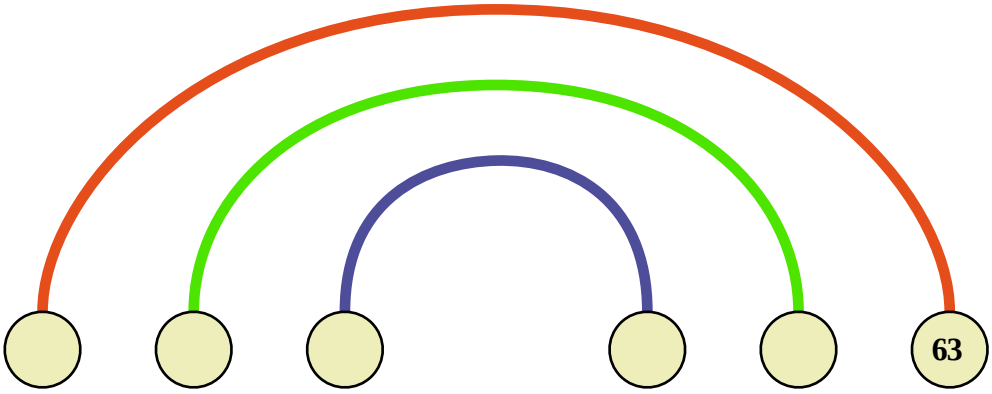
[4 marks]

(v) Write in a list, all the factors of 56

[1 mark]

Question 6

(i) Complete the factor rainbow for 63



[5 marks]

(ii) Write in a list, all the factors of 63

[1 mark]