



1

- Write down all the factors of 36.
- Write down the first five multiples of 7.
- Here is a list of numbers.
15 23 27 31 39 49
Write down the prime numbers in the list.

(3 marks)

a) factor pairs

$$1 \times 36$$

$$2 \times 18$$

$$3 \times 12$$

$$4 \times 9$$

$$6 \times 6$$

1, 2, 3, 4, 6, 9, 12, 18, 36

b) 7 times table

7, 14, 21, 28, 35

c) cross out the ones that divide

$$15 = 3 \times 5, 27 = 3 \times 9$$

$$39 = 3 \times 13, 49 = 7 \times 7$$

23 and 31

2

- Meera says
"Every multiple of 5 ends in the digit 5."
Give an example to show that Meera is wrong.

(2 marks)

Multiples of 5 end in 5 or 0

*Any multiple of 5 that ends in 0, such as 10, 20 or 30, shows
Meera is wrong*

Any multiple of 5 ending in 0, e.g. 10

3

- a. Write down all the common factors of 24 and 40.
b. Write down the first three common multiples of 6 and 8.

(3 marks)

a) List the factors of each

24: 1, 2, 3, 4, 6, 8, 12, 24

40: 1, 2, 4, 5, 8, 10, 20, 40

1, 2, 4, 8

b) List the multiples of each

6: 6, 12, 18, 24, 30, 36, 42, 48

8: 8, 16, 24, 32, 40, 48

then keep adding 24

24, 48, 72

4

- a. By listing factors, find the highest common factor (HCF) of 18 and 30.
b. By listing multiples, find the lowest common multiple (LCM) of 18 and 30.

(3 marks)

a) factors

18: 1, 2, 3, 6, 9, 18

30: 1, 2, 3, 5, 6, 10, 15, 30

HCF = 6

b) multiples

18: 18, 36, 54, 72, 90

30: 30, 60, 90

LCM = 90

5 Work out how many positive whole numbers less than 100 are multiples of both 4 and 6.

(3 marks)

We count positive whole numbers only, excluding zero and negative multiples. The least common multiple of 4 and 6 is 12 because it is the first number in both positive multiplication lists

A number that is a multiple of both 4 and 6 must be a multiple of 12

Multiples of 12 less than 100: 12, 24, 36, 48, 60, 72, 84, 96

There are 8 such numbers

8

6 a. Write 180 as a product of its prime factors. Give your answer in index form.

b. Write 350 as a product of its prime factors. Give your answer in index form.

(3 marks)

a) keep dividing by primes

$$180 = 2 \times 90$$

$$90 = 2 \times 45$$

$$45 = 3 \times 15$$

$$15 = 3 \times 5$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

$$2^2 \times 3^2 \times 5$$

b)

$$350 = 2 \times 175$$

$$175 = 5 \times 35$$

$$35 = 5 \times 7$$

$$350 = 2 \times 5 \times 5 \times 7$$

$$2 \times 5^2 \times 7$$

7 Write down two numbers, both greater than 20, whose highest common factor (HCF) is 7

(2 marks)

Both numbers must be multiples of 7 that are greater than 20

The multiples of 7 used must not share any other common factor

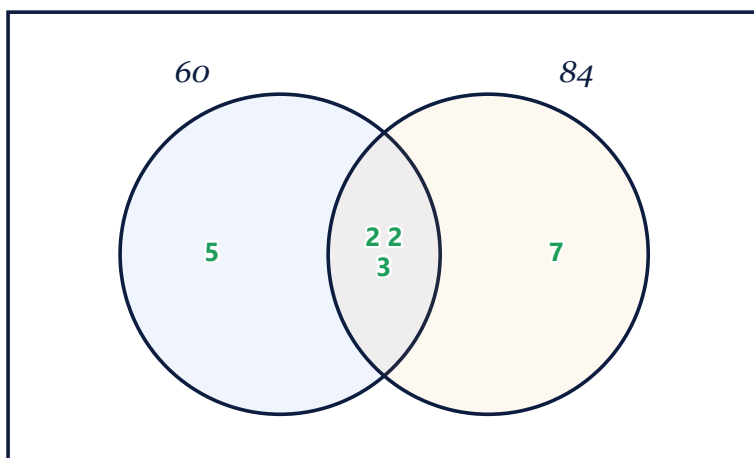
For example $21 = 3 \times 7$ and $28 = 4 \times 7$: since 3 and 4 have no common factor greater than 1, $\text{HCF}(21, 28) = 7$

8

$$60 = 2 \times 2 \times 3 \times 5$$

$$84 = 2 \times 2 \times 3 \times 7$$

- Complete the Venn diagram to show the prime factors of 60 and 84.
- Use your Venn diagram to find the highest common factor (HCF) of 60 and 84.
- Use your Venn diagram to find the lowest common multiple (LCM) of 60 and 84.



(4 marks)

a) shared primes go in the middle

both: 2, 2, 3

60 only: 5

84 only: 7

b) HCF = multiply the middle

$$2 \times 2 \times 3 = 12$$

$$\boxed{\text{HCF} = 12}$$

c) LCM = multiply everything

$$5 \times 2 \times 2 \times 3 \times 7 = 420$$

$$\boxed{\text{LCM} = 420}$$

9

$$A = 2^3 \times 3 \times 5^2$$

$$B = 2^2 \times 3^2 \times 5$$

- Find the highest common factor (HCF) of A and B.
- Find the lowest common multiple (LCM) of A and B.
Give your answers as products of powers of primes.

(3 marks)

a) For the HCF take the lowest power of each common prime

$$2^2, 3 \text{ and } 5, \text{ so } \text{HCF} = 2^2 \times 3 \times 5 = 60$$

b) For the LCM take the highest power of each prime

$$2^3, 3^2 \text{ and } 5^2, \text{ so } \text{LCM} = 2^3 \times 3^2 \times 5^2 = 1800$$

10

- a. Write 126 as a product of its prime factors.
b. Find the lowest common multiple (LCM) of 126 and 60

(4 marks)

$$a) 126 = 2 \times 63, 63 = 9 \times 7 = 3^2 \times 7, \text{ so } 126 = 2 \times 3^2 \times 7$$

$$b) 60 = 2^2 \times 3 \times 5$$

b) Take the highest power of each prime

$$2^2, 3^2, 5 \text{ and } 7, \text{ so LCM} = 4 \times 9 \times 5 \times 7 = 1260$$

11

- a. Write 448 as a product of powers of its prime factors.
b. Find the highest common factor (HCF) of 448 and 168

(4 marks)

$$a) 448 = 2 \times 224 = 2 \times 2 \times 112 = 2 \times 2 \times 2 \times 56 = 2 \times 2 \times 2 \times 2 \times 28 = 2 \times 2 \times 2 \times 2 \times 2 \times 14 = 2^6 \times 7$$

$$b) 168 = 2^3 \times 3 \times 7$$

b) Take the lowest power of each common prime

$$2^3 \text{ and } 7, \text{ so HCF} = 8 \times 7 = 56$$

12

- a. Miss Khan has 48 pencils and 72 rulers. She puts all of them into packs so that every pack is the same. She makes as many packs as possible. How many packs does she make, and what is in each pack?
b. A number 12 bus leaves the school every 12 minutes. A number 20 bus leaves the school every 20 minutes. Both buses leave the school at 08:00. When is the next time they both leave the school together?

(4 marks)

a) biggest number that divides both: HCF

$$48 = 2^4 \times 3$$

$$72 = 2^3 \times 3^2$$

$$\text{HCF} = 2^3 \times 3 = 24$$

$$48 \div 24 = 2$$

$$72 \div 24 = 3$$

24 packs of 2 pencils and 3 rulers

b) first time in both lists: LCM

20: 20, 40, 60

12: 12, 24, 36, 48, 60

$$\text{LCM} = 60 \text{ minutes}$$

09:00