



- 1 List all the factors of 28.

(2 marks)

Work in factor pairs: 1×28 , 2×14 , 4×7

The factors of 28 are 1, 2, 4, 7, 14 and 28

1, 2, 4, 7, 14, 28

- 2 Find all the factor pairs of 60

(2 marks)

$$1 \times 60$$

$$2 \times 30$$

$$3 \times 20$$

$$4 \times 15$$

$$5 \times 12$$

$$6 \times 10$$

7, 8, 9 do not go; 10 is already used, so stop

6 pairs, as above

- 3 List all the prime numbers between 20 and 35.

(2 marks)

Check each number from 21 to 34

$21 = 3 \times 7$, $25 = 5 \times 5$, $27 = 3 \times 9$, $33 = 3 \times 11$ and all even numbers in this interval are divisible by 2 and greater than 2, so are not prime

The primes between 20 and 35 are 23, 29 and 31

23, 29, 31

4

- a. Write down all the common factors of 24 and 36
b. Write down the first three common multiples of 6 and 8

(3 marks)

a)

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

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

1, 2, 3, 4, 6, 12

b)

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

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

24 is the first, then go up in 24s

24, 48, 72

5

Find the highest common factor (HCF) of 48 and 84

(2 marks)

$$48 = 2^4 \times 3 \text{ and } 84 = 2^2 \times 3 \times 7$$

Take the lowest power of each common prime: 2^2 and 3

$$\text{HCF} = 4 \times 3 = 12$$

12

6

Find the lowest common multiple (LCM) of 15 and 18

(3 marks)

$$15 = 3 \times 5 \text{ and } 18 = 2 \times 3^2$$

Take the highest power of every prime that appears: 2, 3^2 and 5

$$\text{LCM} = 2 \times 9 \times 5 = 90$$

A common multiple must contain enough prime factors to be divisible by both numbers.
Taking the larger power of each prime provides exactly enough, giving the lowest such multiple

90

7

For each problem, write down whether you would use the highest common factor (HCF) or the lowest common multiple (LCM). You do not need to solve them.

- Two buses leave the school at 8 am. One returns every 12 minutes and the other every 18 minutes. When are they next back at the school together?
- Two ribbons, 45 cm and 60 cm long, are cut into pieces that are all the same length, with nothing left over. What is the longest each piece can be?

(2 marks)

a) times are multiples of 12 and 18

first one they share

LCM

b) the length must divide 45 and 60

biggest one that does

HCF

8

Write 84 as a product of its prime factors.

(2 marks)

$$84 = 2 \times 42$$

$$42 = 2 \times 21 \text{ and } 21 = 3 \times 7$$

$$\text{So } 84 = 2 \times 2 \times 3 \times 7 = 2^2 \times 3 \times 7$$

$$2^2 \times 3 \times 7$$

9

Write 360 as a product of powers of its prime factors.

(3 marks)

$$360 = 2 \times 180, 180 = 2 \times 90, 90 = 2 \times 45$$

$$45 = 3 \times 15 \text{ and } 15 = 3 \times 5$$

$$\text{So } 360 = 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 2^3 \times 3^2 \times 5$$

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

10

Mr Hussain has 42 pencils and 56 rubbers.

He puts them all into identical packs, with nothing left over.

- What is the greatest number of packs he can make?
- How many pencils and how many rubbers are in each pack?

(3 marks)

a) number of packs divides 42 and 56: HCF

42: 1, 2, 3, 6, 7, 14, 21, 42

56: 1, 2, 4, 7, 8, 14, 28, 56

HCF = 14

14 packs

b)

$42 \div 14 = 3$

$56 \div 14 = 4$

3 pencils and 4 rubbers

11

Two warning buoys are anchored in a harbour.

One buoy flashes every 24 seconds.

The other buoy flashes every 40 seconds.

At 8 pm the two buoys flash at the same time.

Work out how many seconds later the two buoys next flash at the same time.

(3 marks)

The buoys flash together at common multiples of 24 and 40

$24 = 2^3 \times 3$ and $40 = 2^3 \times 5$, so $\text{LCM} = 2^3 \times 3 \times 5 = 120$

They next flash together 120 seconds (2 minutes) later

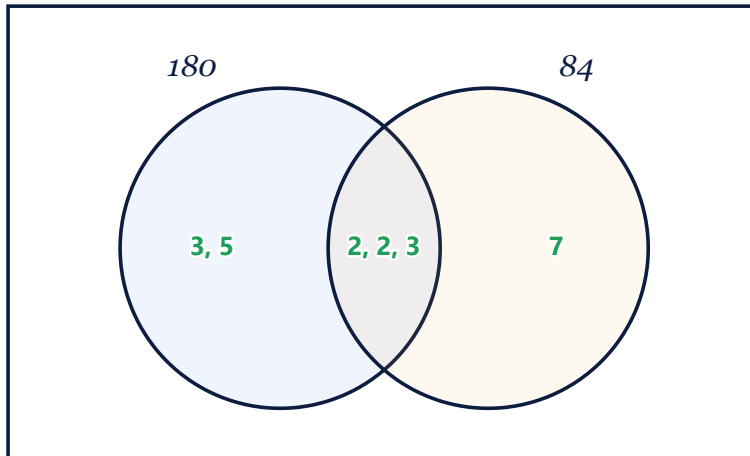
120 seconds

12

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

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

- Complete the Venn diagram to show the prime factors of 180 and 84
- Find the highest common factor (HCF) of 180 and 84
- Find the lowest common multiple (LCM) of 180 and 84



(4 marks)

a)

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

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

shared: 2, 2, 3 go in the middle

180 only: 3, 5

84 only: 7

middle 2, 2, 3; left 3, 5; right 7

b) multiply the middle

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

$$\text{HCF} = 12$$

c) multiply everything

$$3 \times 5 \times 2 \times 2 \times 3 \times 7 = 1260$$

$$\text{LCM} = 1260$$