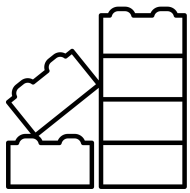
Name & Surname: _____ Class: _____ Date: _____

Prime Factors, HCF and LCM

Break numbers into primes to compare them.

About 35 minutes Level ★★★☆☆



Prime Factors, HCF and LCM

A **prime number** has exactly two **factors**: 1 and itself. Every whole number greater than 1 can be written as a product of primes in only one way.

- Write the **prime factorisation** with a factor tree. Example: $18 = 2 \times 3 \times 3 = 2 \times 3^2$.
- **HCF** uses the lowest power of each shared prime. For $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$, HCF $= 2 \times 3 = 6$.
- **LCM** uses the highest power of each prime. For 12 and 18, LCM $= 2^2 \times 3^2 = 36$.

Task A

/2

Follow the prime factor steps, then try the HCF and LCM questions.

WORKED EXAMPLE

Find the HCF of 12 and 18.

1. $12 = 2 \times 2 \times 3 = 2^2 \times 3$
2. $18 = 2 \times 3 \times 3 = 2 \times 3^2$
3. Shared primes with lowest powers: $2 \times 3 = 6$

Answer: 6

YOUR TURN

Find the HCF of 20 and 28.

Answer: _____

WORKED EXAMPLE

Find the LCM of 12 and 18.

1. $12 = 2^2 \times 3$
2. $18 = 2 \times 3^2$
3. Highest powers of each prime: $2^2 \times 3^2 = 4 \times 9 = 36$

Answer: 36

YOUR TURN

Find the LCM of 20 and 28.

Answer: _____

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Practise Prime Factors

Practise primes, factors and HCF step by step.

Key words

prime number: has only 1 and itself as factors

multiple: a number in its times table

HCF: highest common factor

prime factorisation: a number written using only prime multiplications

factor: a number that divides exactly

common factor: a factor of two numbers

LCM: lowest common multiple

Task B /12

Practise prime factors and common factors to find the HCF.

WARM UP

1. List all **factors** of 12.

   Answer: _____

2. Write the first four **multiples** of 5.

   Answer: _____

3. Circle the **prime numbers**: 4, 7, 9, 11, 15.

   Answer: _____

4. Write 12 as a **product** of **primes** in index form.

   Answer: _____

PRACTISE

5. Write 30 as a **product** of **prime factors**.

   Answer: _____

6. Write 36 in **index form**.

   Answer: _____

7. List the **common factors** of 12 and 18.

   Answer: _____

8. Find the **HCF** of 12 and 18.

   Answer: _____

PROBLEM SOLVING

9. Find the **HCF** of 20 and 30.

   Answer: _____

10. A student says 1 is a **common multiple** of 6 and 8. Explain how you know they are wrong.

    Answer: _____

11. Ribbon pieces 24 cm and 36 cm are cut into equal pieces with no waste. What is the **longest** piece you can cut? Use **HCF**.

    Answer: _____

12. A student stops a factor tree at 6 × 10 for 60 and says 60 = 6 × 10 is the **prime factorisation**. Explain how you know more steps are needed.

    Answer: _____

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Find LCM and HCF

Use prime factors to find LCM and HCF.

Task C /12

Use prime factorisation to find LCM and HCF.

WARM UP

1. Find the **LCM** of 4 and 6.

Answer: _____

2. Find the **LCM** of 6 and 8.

Answer: _____

3. Write 48 in **index form**.

Answer: _____

4. Work out 2 × 3 × 7. What **product** is it?

Answer: _____

PRACTISE

5. Find the **LCM** of 12 and 15.

Answer: _____

6. Find the **HCF** of 24 and 40.

Answer: _____

7. Given A = 2^3 × 3 and B = 2 × 3 × 5, find the **HCF** of A and B.

Answer: _____

8. For the same A and B, find the **LCM**.

Answer: _____

PROBLEM SOLVING

9. Two buses leave together. One returns every 12 **minutes**, the other every 18 **minutes**. After how many minutes will they leave together again?

Answer: _____

10. Two lights flash together now. One flashes every 8 **seconds**, the other every 10 **seconds**. After how many seconds do they flash together again?

Answer: _____

11. A student says the **LCM** of 6 and 8 is 48 because 6 × 8 = 48. Explain how you know 24 is correct.

Answer: _____

12. Explain how you know 2 × 2 × 3 × 5 can only make 60, so **prime factorisation** is **unique**.

Answer: _____

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Match Maths Words

Play pairs to learn the key vocabulary.

Task D

Cut out the cards and match each key word to its meaning.

Cut out the cards.

factor shared by two numbers	**HCF**	**factor**	 **common multiple**
divides a number exactly	multiple shared by two numbers	has only 1 and itself as factors	times table answer for a number
largest shared factor	**multiple**	 **prime number**	**common factor**

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Multiples and Tables

Spot multiples in sequences and the grid.

Task E

/6

Write the missing multiples and find the next terms.

1	6	12	18	24		
2	8	16		32		48
3	2	4	8	16		

Task F

/9

Use the multiplication grid to spot factors and multiples.

×	4	5	6	12
6				
7			42	84
8				96

How did I do?

Circle a face for each line.

I can write prime factorisation using product notation. ☹ 😐 ☺

I can find the HCF of two numbers. ☹ 😐 ☺

I can find the LCM of two numbers. ☹ 😐 ☺

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Answer sheet: Prime Factors, HCF and LCM

Task A

1. 4
2. 140

Task B

1. 1, 2, 3, 4, 6, 12
2. 5, 10, 15, 20
3. 7, 11
4. $2^2 \times 3$
5. $2 \times 3 \times 5$
6. $2^2 \times 3^2$
7. 1, 2, 3, 6
8. 6
9. 10
10. 1 is a factor of every number, not a multiple. Multiples of 6 are 6, 12, 18, 24 and of 8 are 8, 16, 24, so the LCM is 24.
11. 12 cm
12. 6 and 10 are not prime. Continue splitting: $60 = 2^2 \times 3 \times 5$.

Task C

1. 12
2. 24
3. $2^4 \times 3$
4. 42
5. 60
6. 8
7. 6
8. 120
9. 36 minutes
10. 40 seconds
11. 48 is a common multiple, but 24 is smaller and is the lowest. LCM = $2^3 \times 3 = 24$.
12. Any order multiplies to 60, and no other primes divide 60. Every number over 1 has one prime factorisation.

Task D

prime number = has only 1 and itself as factors
factor = divides a number exactly
multiple = times table answer for a number
common factor = factor shared by two numbers
common multiple = multiple shared by two numbers
HCF = largest shared factor

Task E

1. 30, 36
2. 24, 40
3. 32, 64

Task F

6 × 4, 5, 6, 12: 24, 30, 36, 72

7 × 4, 5, 6, 12: 28, 35, 42, 84

8 × 4, 5, 6, 12: 32, 40, 48, 96

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