

Primes, factors, LCM and HCF

About 50 minutes No calculator 41 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-primes-factors-lcm-and-hcf/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks]

Work out 59×41 without a calculator.

Answer

A2 Last lesson [2 marks]

By rounding each number to 1 significant figure, estimate the value of $\frac{89.7 \times 3.04}{0.435}$.

Answer

- A3** Key Stage 3 [2 marks]

Ali has £160. He spends $\frac{1}{4}$ of it on a coat and $\frac{1}{5}$ of what is left on shoes. How much money does he have left?

Answer

A4 Key Stage 3 [2 marks]

After a 20% increase, the price of a bike is £672. What was the price before the increase?

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Write 360 as a product of its prime factors. Give your answer in index form.

Hint Divide by the smallest prime that goes in, again and again, until you reach 1.

- B1** Write 588 as a product of its prime factors. Give your answer in index form. [2 marks]
- Answer

EXAMPLE 2

Find the highest common factor (HCF) and the lowest common multiple (LCM) of 140 and 196.

Hint For the HCF take the shared primes at the lower power. For the LCM take every prime at the higher power.

B2 Find the highest common factor (HCF) and the lowest common multiple (LCM) of 96 and 150. [3 marks]

Answer HCF = LCM =

c Practice

C1 $A = 2^3 \times 5^2 \times 7$ and $B = 2^2 \times 5 \times 7^2$. Work out the HCF of A and B . Give it as an ordinary number. [2 marks]

Answer

C3 Work out $(-2)^3 - 4 \times (-3)$. [2 marks]

Answer

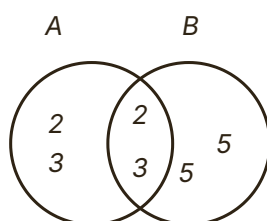
C2 $1200 = 2^a \times 3 \times 5^b$. Find the value of a and the value of b . [2 marks]

Answer $a = \dots\dots$ $b = \dots\dots$

C4 Find the smallest whole number k such that $90k$ is a square number. [2 marks]

Answer

C5 The Venn diagram shows the prime factors of two numbers, A and B . Work out the HCF and the LCM of A and B . [2 marks]



Answer HCF = LCM =

C6 Work out $\sqrt{2^4 \times 3^2 \times 5^2}$. Give your answer as an ordinary number. [2 marks]

Answer

C7 Between which two consecutive whole numbers does $\sqrt[3]{100}$ lie? [1 mark]

Answer and

C8 Show that 91 is not a prime number. [1 mark]

D Exam-style questions

- D1** Ali runs one lap of a track in 84 seconds. Ben runs one lap in 105 seconds. They start together from the same point and keep running. After how many minutes are they next at the start together? You must show your working. [3 marks]

Answer

- D2** A gardener has 120 tulip bulbs and 168 daffodil bulbs. She plants all of them in rows. Every row has the same number of tulips and the same number of daffodils. She wants as many rows as possible.

- (a) Write 120 and 168 as products of their prime factors. [2 marks]

- (b) Work out the greatest number of rows she can plant. [2 marks]

Answer

- (c) How many bulbs are in each row? [1 mark]

Answer

Total for D2: 5 marks

- D3** Sam says, "The LCM of 36 and 54 is 1944, because $36 \times 54 = 1944$." [3 marks]

Explain why Sam is wrong. Work out the LCM of 36 and 54.

Answer

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** Two whole numbers have a product of 1764 and a highest common factor of 7. Neither number is 7. Find the two numbers. [3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Write each number as 7 times a whole number. Those two whole numbers have no common factor.
- Hint 2** $7m \times 7n = 1764$, so $mn = 36$, where m and n have an HCF of 1.
- Hint 3** The pairs with product 36 and HCF 1 are 1×36 and 4×9 . The first gives the number 7, which is not allowed, so the numbers are 28 and 63.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can write a number as a product of its prime factors in index form. ☐ ☐ ☐

I can use prime factors to find the HCF and LCM of two numbers. ☐ ☐ ☐

I can work out expressions with negative numbers and powers. ☐ ☐ ☐