



# HARDER HCF & LCM

Task 1 – Use the prime factorisation of the following numbers to answer the questions below.

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

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

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

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$E = 2^3 \times 3 \times 5^2 \times 11$$

$$F = 3^3 \times 5 \times 7 \times 13$$

7) Work out the LCM of B and F.

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

$$F = 3^3 \times 5 \times 7 \times 13$$

$$LCM = 2^3 \times 3^3 \times 5 \times 7 \times 13 = 98,280$$

8) Work out the LCM of D and E.

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$E = 2^3 \times 3 \times 5^2 \times 11$$

$$LCM = 2^4 \times 3^2 \times 5^2 \times 7 \times 11 = 277,200$$

1) Work out the HCF of A and B.

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

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

$$HCF = 2^3 \times 3 \times 5 = 120$$

9) Work out the LCM of A and E.

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

$$E = 2^3 \times 3 \times 5^2 \times 11$$

$$LCM = 2^5 \times 3^2 \times 5^3 \times 11 = 396,000$$

2) Work out the HCF of B and D.

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

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$HCF = 2^3 \times 3 \times 5 = 120$$

10) Work out the LCM of A, B and D. Give your answer as a product of prime factors.

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

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

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$LCM = 2^5 \times 3^2 \times 5^3 \times 7$$

3) Work out the HCF of D and E. Give your answer as a product of prime factors.

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$E = 2^3 \times 3 \times 5^2 \times 11$$

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

## Task 2

11) Let,

$$A = 2^6 \times 3^3 \times 7^2$$

$$B = 2^3 \times 3^2 \times 11$$

a. Work out the HCF of A and B.

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

b. Work out the LCM of A and B.

$$LCM = 2^6 \times 3^3 \times 7^2 \times 11 = 931,392$$

12) Given that

$$C = 3^2 \times 5 \times 7$$

$$D = 3^3 \times 5^2 \times 7^2$$

a. Work out the HCF of C and D.

$$HCF = 3^2 \times 5 \times 7 = 315$$

b. Find the LCM of C and D, giving your answer in index form.

$$LCM = 3^3 \times 5^2 \times 7^2$$

5) Work out the HCF of B, C and D.

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

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

$$D = 2^4 \times 3^2 \times 5 \times 7$$

$$HCF = 2 \times 3 = 6$$

6) Work out the LCM of A and C. Give your answer as a product of prime factors.

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

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

$$LCM = 2^5 \times 3^3 \times 5^3 \times 7^2$$

13) Given that

$$E = 2^4 \times 3^2 \times 5^3$$

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

a. Work out the HCF of E and F.

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

b. Work out the LCM of E and F.

$$\text{LCM} = 2^4 \times 3^2 \times 5^3 \times 7 = 126,000$$

14) Let  $G = 3 \times 5^2 \times 11^2$  and  $H = 15 \times 11 \times 7^2$ .

a. Work out the HCF of G and H.

$$H = 3 \times 5 \times 7^2 \times 11$$

$$\text{HCF} = 3 \times 5 \times 11 = 165$$

b. Write the product  $G \times H$  as a product of prime factors in simplest form.

$$G \times H = 3^2 \times 5^3 \times 7^2 \times 11^3$$

15) Given  $A = 2^4 \times 3^a \times 7^b$ , write  $35A$  as a product of prime factors, in terms of a and b.

$$35 = 5 \times 7$$

$$A = 2^4 \times 3^a \times 7^b$$

$$35A = 2^4 \times 3^a \times 5 \times 7^{b+1}$$

16) Given  $B = 2^x \times 3^y \times 5^2$ , write  $270B$  as a product of prime factors in terms of x and y.

$$270 = 2 \times 3^3 \times 5$$

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

$$270B = 2^{x+1} \times 3^{y+3} \times 5^3$$