Name:

Section:

# HCF/LCM Worksheet

**1** **(a)** Write 420 as the product of its prime factors.

..... [2]

**(b)** Given that $1512 = 2^3 \times 3^3 \times 7$, find the highest common factor of 420 and 1512.

..... [1]

**2** **(a)** Write 216 as a product of its prime factors.

..... [2]

**(b)** Two positive integers are each greater than 25.
Their lowest common multiple (LCM) is 216.
Their highest common factor (HCF) is 18.

Find the two integers.

..... and ..... [2]

**3** **(a)** Write 108 as the product of its prime factors.

..... [2]

**(b)** Find the lowest common multiple (LCM) of 108 and 180.

..... [2]

**4** **(a)** Write 168 as a product of its prime factors.

..... [2]

**(b)** The highest common factor of 168 and $N$ is 42.

Given that $200 < N < 300$, find the two possible values of $N$.

$N =$ ..... and $N =$ ..... [2]

**5** **(a)** **(i)** Write 54 as the product of its prime factors.

*Answer* ..... [1]

**(ii)** Find the smallest possible integer $m$ such that $54m$ is a cube number.

*Answer* $m =$ ..... [1]

**6** **(a)** Express 96 as a product of its prime factors.

*Answer* ..... [1]

**(b)** 24 is a common factor of 96 and the integer $n$.

Given that $n$ is less than 96, find the largest possible value of $n$.

*Answer* ..... [1]



**7** **(a)** Express 198 as the product of its prime factors.

*Answer* ..... [1]

**(b)** $M = 2^2 \times 3 \times 5^2$ $N = 2^3 \times 3^2 \times 7$

**(i)** Find the largest number that divides exactly into $M$ and $N$.

*Answer* ..... [1]

**(ii)** Find the smallest value of $k$, such that $M \times k$ is a cube number.

*Answer* $k =$ ..... [1]

**8** **(a)** Express 60 as a product of its prime factors.

*Answer* ..... [1]

**(b)** Find the smallest possible integer $m$ such that $60m$ is a square number.

*Answer* $m =$ ..... [1]

**(c)** The lowest number that is a multiple of both 60 and the integer $n$ is 180 .

Find the smallest possible value of $n$.

*Answer* $n =$ ..... [1]

**9** **(a)** Express 180 as the product of its prime factors.

*Answer* .....[1]

**(b)** $\sqrt{180}$ can be expressed in the form $p\sqrt{q}$, where $p$ and $q$ are integers.

Find the smallest value of $p + q$.

*Answer* .....[1]

**10** **(a)** Express 108 as a product of its prime factors.

*Answer* .....[1]

**(b)** Written as products of their prime factors, $N = 2^p \times 5^q \times 7^r$ and $500 = 2^2 \times 5^3$ .

The highest common factor of $N$ and 500 is $2^2 \times 5^2$ .
The lowest common multiple of $N$ and 500 is $2^3 \times 5^3 \times 7$ .

Find $p$, $q$ and $r$.

*Answer* $p$ = ..... , $q$ = ..... , $r$ = ..... [2]

**11** Written as a product of prime factors, $168 = 2^3 \times 3 \times 7$.

**(a)** Express 140 as a product of its prime factors.

(*a*) .....[1]

**(b)** Find the highest common factor of 168 and 140.

(*b*) .....[1]

**(c)** Find the smallest positive integer, $n$, such that $168n$ is a square number.

(*c*) .....[1]

**12** **(a)** Write down all the factors of 18.

(*a*) .....[1]

**(b)** Write 392 as the product of its prime factors.

(*b*) ..... [1]

**13** Written as the product of its prime factors, $360 = 2^3 \times 3^2 \times 5$.

**(a)** Write 108 as the product of its prime factors.

**(b)** Find the lowest common multiple of 108 and 360.
Give your answer as the product of its prime factors.

**(c)** Find the smallest positive integer $k$ such that $360k$ is a cube number.



*Answer (a)* 108 = .....[1]

*(b)* .....[1]

*(c)* $k$ = .....[1]