

1.

(a) Express 99 as the product of its prime factors.

(b) Find the smallest possible integer value of n for which $99n$ is a multiple of 24.

(c) What special kind of numbers are $\sqrt{2}$ and π ?

2.

(a) (i) Express 7056 as the product of its prime factors.

(ii) Hence evaluate $\sqrt{7056}$.

- (b) $\sqrt{5\frac{1}{16}}$ can be expressed as the rational number $\frac{p}{q}$ where p and q are integers.

Find the value of p and the value of q .

- (c) Write down an example of an irrational number.

3.

Green Line buses run every 10 minutes.

Red Line buses run every 20 minutes.

Purple Line buses run every 35 minutes.

One bus from each Line leaves the city centre at 09 00.

After how many minutes will buses from all three Lines next leave the city centre at the same time?

It is given that $N = 87 \times 132$.

- (a) Complete the statements in the answer space.

Answer (a) $88 \times 132 = N + \dots\dots\dots$ [1]

$87 \times 131 = N - \dots\dots\dots$ [1]

- (b) Hence evaluate $88 \times 132 - 87 \times 131$.

4

(a) Express 154 as the product of its prime factors.

(b) Find the lowest common multiple of 154 and 49.

5.

It is given that $68.2 \times 0.235 = 16.027$.

Hence evaluate

(a) 0.0682×2350 ,

(b) $160.27 \div 0.0235$.

6

(a) Write down all the factors of 18.

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

7.

Given that n is an integer and $n > 1$, decide whether each statement in the table is **true** or **false**.

For each statement write **true** or **false** in the table.

If you write **false**, give an example to justify your decision.

Statement	True or False	Example (if false)
$n^3 > 1$		
$\frac{1}{n} > \frac{1}{n^2}$		
$(n-1)(n+3)$ is always odd		

8.

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

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

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

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

9.

(b) Write down an irrational number between 3 and 4.

10.

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

(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 .

11.

Buses following route A leave the bus station every five minutes.
Buses following route B leave the bus station every six minutes.
Buses following route C leave the bus station every nine minutes.
Three buses, following routes A, B and C, leave together at 13 00.

What is the next time when buses following all three routes leave the bus station together?

12.

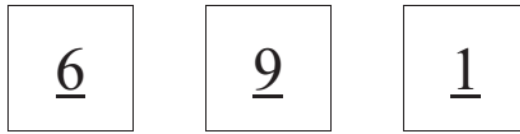
0.2	2	$\sqrt{2}$	$\frac{1}{3}$	0.83	8	81
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From the numbers listed above, write down

(a) a prime number,

(c) an irrational number.

(b) a cube number,



The three cards above can be rearranged to make three-digit numbers, for example 916.

Arrange the three cards to make

(a) the three-digit number that is closest to 650,

(b) the three-digit number that is a multiple of 7,

(c) a three-digit number that is a square number.

14.

- (a) James thinks of a **two-digit** number.
It is a cube number.
It is an even number.

What is his number?

- (b) Omar thinks of a **two-digit** number.
It is a factor of 78.
It is a prime number.

What is his number?

- (c) Write down an irrational number between 1 and 2.

15.

- (a) Find an integer r such that $r > 5$ and $5r - 1$ is a square number.

- (b) Find the value of s which makes $8s + 2$ a prime number.

- (c) Write down an irrational number between 7 and 8.

16.

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

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

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

Find the smallest possible value of n .

17.

(a) Express 500 as the product of its prime factors.

(b) $M = 2 \times 3^2$ $N = 2^4 \times 3^2$

Find the values of p and q when

(i) $M \times N = 2^p \times 3^q$,

(ii) $M \div N = 2^p \times 3^q$,

(iii) $N^2 = 2^p \times 3^q$.

18

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

(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 .