1 Work out the lowest common multiple (LCM) of 120 and 144

[2 marks]

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

$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$ (1)

Lcm: $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 720$ (1)

Answer 720

2 Write 200 as a product of prime factors.

Give your answer in index form.

[3 marks]

200
2 100
2 50 (1)
2 25
5 5

(1)

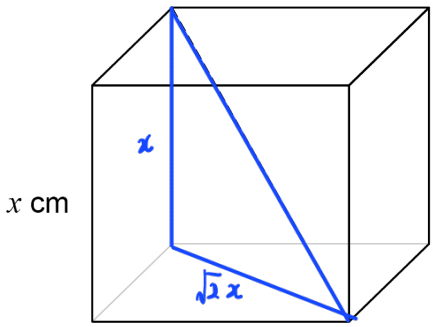
$2 \times 2 \times 2 \times 5 \times 5 = 200$

$2^3 \times 5^2$

Answer $2^3 \times 5^2$ (1)

3 Here is a cube with edge length x cm

One diagonal is shown.



3 (a) The total length, in centimetres, of the edges of the cube is a multiple of 18

Circle the correct statement.

↳ 12 edges

= 12x

[1 mark]

x is a whole number	x is not a whole number	x might be a whole number

1

4 Erik thinks of a prime number between 20 and 30

His number is x% of 125

Work out **one** possible value of x.

[3 marks]

Prime number : 23 (1)

$\frac{23}{125} \times 100$ (1)

$= 18.4$

Answer 18.4 (1)

5 Show that 2125 can be written as

a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

prime number : 11, 13, 17, 19

2125 is only divisible by 17.

$2125 \div 17 = 125$

$\sqrt[3]{125} = 5$ (2)

$\therefore 5^3 \times 17 = 2125$

6 Q and R are two numbers.

As a product of prime factors,

$$Q = 2^3 \times 3 \times a^3$$

$$R = 2^4 \times 3^2 \times a^2$$

6 (a) The highest common factor (HCF) of Q and R is 4056

Work out the value of a.

[2 marks]

HCF of Q and R $= 2^3 \times 3 \times a^2 = 4056$

$8 \times 3 \times a^2 = 4056$

$24\,a^2 = 4056$ (1)

$a^2 = 169$

$a = 13$ (1)

$a =$ 13

6 (b) Work out the lowest common multiple (LCM) of Q and R.

[2 marks]

LCM of Q and R $= 2^4 \times 3^2 \times a^3$ (1)

$= 2^4 \times 3^2 \times 13^3$

$= 16 \times 9 \times 2197$

$= 316\,368$ (1)

Answer 316 368

7 Two prime numbers are multiplied together.

The answer is an **even** number between 50 and 60

Complete the calculation.

[3 marks]

(1) (1) (1)

29 × 2 = 58

prime number : (2) 3, 5, 7, 11, 13, 17, 19, 23, (29)

Even number 50<x<60 : 52, 54, 56, (58)

8 Written as the product of prime factors,

$12\,600 = 2^3 \times 3^2 \times 5^2 \times 7$

and

$14\,112 = 2^5 \times 3^2 \times 7^2$

Work out the highest common factor (HCF) of 12 600 and 14 112

Give your answer as an integer.

[2 marks]

HCF : $2^3 \times 3^2 \times 7$ = $8 \times 9 \times 7$ (1)

= 504 (1)

Answer 504

9 (a) a and b are different prime numbers.

$a^3 \times b^2 = 200$

Work out the value of $a^4 \times b$

[3 marks]

Factors of 200 : 1, 2, 4, 5, 8, 10, 20, 25, 40, 50, 100, 200

Cubic number = 8, so $a = 2$

$b^2 = \frac{200}{8} = 25$

$b = 5$

$a^4 \times b = 2^4 \times 5 = 16 \times 5$

$= 80$

Answer 80 (3)

9 (b) c and d are different prime numbers.

Circle the equation for which $c^4 \times d^2 \times e$ is a cube number.

[1 mark]

$e = cd$ $e = c^2d$ (1) $e = c^2d^2$ $e = c^3d^3$