PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

HCF, LCM and Prime Factors: exam questions

10 questions · 23 marks · mark schemes at the end

Name _____ Date _____ Score / 23

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/hcf-lcm-and-prime-factors

1. **2 marks**

Write 756 as a product of its prime factors.

2. **2 marks**

$A = 2^3 \times 3 \times 5^2$ and $B = 2^2 \times 3^2 \times 7$.

(a) Find the highest common factor (HCF) of A and B. **(1)**

(b) Find the lowest common multiple (LCM) of A and B. **(1)**

3. **2 marks**

Find the highest common factor of 84 and 120.

4. **3 marks**

Two buses leave a bus station at 9 am. One bus returns every 12 minutes and the other every 18 minutes.

At what time will both buses next be back at the station together?

5. **2 marks**

The HCF of two numbers is 6 and their LCM is 180. One of the numbers is 36.

Find the other number.

6. **3 marks**

A floor is a rectangle 360 cm long and 270 cm wide. It is covered with square tiles, all the same size, with no gaps and no cutting.

Work out the least number of tiles needed.

7. **2 marks**

$540k$ is a square number, where k is a positive whole number.

Find the smallest possible value of k.

8. 3 marks

Pens are sold in packs of 8, pencils in packs of 12 and rulers in packs of 15.

Lena buys exactly the same number of pens, pencils and rulers.

Work out the least number of packs of pencils she can buy.

9. 2 marks

$x = 2^3 \times 3^m$ and $y = 2^k \times 3^2 \times 5$, where m and k are whole numbers.

The HCF of x and y is 36 and the LCM of x and y is 3240.

Find m and k.

10. 2 marks

$a = 2^4 \times 3 \times 7^2$ and $b = 2 \times 3^3 \times 7$.

Write $\frac{a}{b}$ as a fraction in its simplest form.

Answers and worked solutions

Question 1 — 2 marks

M1 a correct method, e.g. a factor tree or repeated division (756, 378, 189, 63, 21, 7)

A1 $2^2 \times 3^3 \times 7$

Answer: $2^2 \times 3^3 \times 7$

Question 2 — 2 marks

(a)

B1 $2^2 \times 3 = 12$

(b)

B1 $2^3 \times 3^2 \times 5^2 \times 7 = 12\,600$

Accept answers left as products of primes.

Answer: (a) 12; (b) 12 600

Question 3 — 2 marks

M1 $84 = 2^2 \times 3 \times 7$ and $120 = 2^3 \times 3 \times 5$, or lists of factors of both

A1 12

Answer: 12

Question 4 — 3 marks

M1 multiples of 12 and 18, or $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$

A1 LCM $= 36$ minutes

A1 9:36 am

Answer: 9:36 am

Question 5 — 2 marks

M1 $\dfrac{6 \times 180}{36}$ (HCF $\times$ LCM $=$ product of the numbers)

A1 30

Answer: 30

Question 6 — 3 marks

M1 the largest tile has side HCF(360, 270)

A1 90 cm

A1 $4 \times 3 = 12$ tiles

Answer: 12 tiles

Question 7 — 2 marks

M1 $540 = 2^2 \times 3^3 \times 5$

A1 $k = 3 \times 5 = 15$

Answer: 15

Question 8 — 3 marks

M1 prime factors of 8, 12 and 15, or lists of multiples

A1 LCM $= 120$

A1 $120 \div 12 = 10$ packs

Answer: 10 packs

Question 9 — 2 marks

B1 $k = 2$ (from $36 = 2^2 \times 3^2$)

B1 $m = 4$ (from $3240 = 2^3 \times 3^4 \times 5$)

Answer: $m = 4$, $k = 2$

Question 10 — 2 marks

M1 cancel the common factor $2 \times 3 \times 7$: $\dfrac{2^3 \times 7}{3^2}$

A1 $\dfrac{56}{9}$

Answer: $\dfrac{56}{9}$

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/hcf-lcm-and-prime-factors
Our own original questions, written and checked by IGCSE Math Revision. Independent, not affiliated with Pearson Edexcel.