

Factor: A factor of a number x is a number that will completely divide x without leaving any remainder. E.g. Factors of 10 are 1,2,5,and 10 , Factors of 12 are 1,2,3,4,6 and 12

Multiple: A multiple of a number is a number that comes in the table of x.
E.g. multiples of 10 are 10,20,30,40 ……. , multiples of 12 are 12,24,36,48 …….

Prime Numbers: Number that has only two factors, one and itself
E.g. 2,3,5,7,11,13,17,19 ……

(i) Factors and Multiples

1. Complete the list of factors of 36.
   1, 2, ... , 36 [2]
2. (a) 1 and 12 are factors of 12. Write down all the other factors of 12. [1]
   (b) Write down the multiples of 9 between 20 and 40. [1]
3. Find the two prime factors of 323 [1]
4. Write 2016 as the product of prime factors. [3]
5. 234 = $2x3^2x13$ 1872 = 2^4x3^2x13 234 x1872 = 438048
   Use this information to write 438048 as a product of its prime factors. [1]
6. 1, 2, 3, 5 and 7 are all common factors of two numbers. Write down the digit that the two numbers must end in. [1]
7. $k = 2 \times 3^2 \times p^3$, where p is a prime number greater than 3.
   Write $6k^2$ as a product of prime factors in terms of p. [2]
8. f is a common factor of 14 and 28. m is a common multiple of 10 and 25. p is a prime number. Work out the largest possible value of $\frac{f}{mp}$ [4]
9. $x = 3^2 \times 5^2 \times 7 \times 199^{57}$ when written as a product of its prime factors.
   Write $x \div 315$ as a product of its prime factors. [2]

Answers

1) 3, 4, 6, 9, 12, 18 2) (a) 2,3,4,6 (b)27 , 36 3) 17 and 19 4) $2^5 \times 3^2 \times 7$ 5) $2^5x\ 3^4x13^2$ 6)0
7) $2^3 \times 3^5 \times p^6$ 8)0.14 9) 5×199^{57}

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



(ii) Square and Cube Numbers

1. N = $2^4 \times 3 \times 7^5$, PN = K , where P is an integer and K is a square number.

Find the smallest value of P. [2] (IGCSE)

2. $P = 2^5 \times 3^3 \times 7$

P×R is a cube number, where R is an integer. Find the smallest possible value of R. [2] (IGCSE)

3. $p = 2^3 \times 3 \times 5^2$

Find the smallest integer □, such that p□□is a square number. [1] (GCE)

4. $120 = 2^3 \times 3 \times 5$

(a) Express 1200 as the product of its prime factors. [1]

(b) Find the smallest value of n, such that 120n is a square number. [1] (GCE)

5. $N = 2 \times 10^8$

Find the smallest positive integer □, given that □□□is a cube number. [1] (GCE)

6. (i) Write 54 as the product of its prime factors. [1]

(ii) Find the smallest possible integer m such that $54m$ is a cube number.[1] (GCE)

7. $M = 2^2 \times 3 \times 5^2$

Find the smallest value of k, such that $M \times k$ is a cube number. [1] (GCE)

8. Given 1800 = $2^3 \times 3^2 \times 5^2$ **hence** write $\sqrt{1800}$ in form p$\sqrt{q}$ [1] (GCE)

9. Given 9000 = $2^3 \times 3^2 \times 5^3$ **hence** write $\sqrt{9000}$ in form p$\sqrt{q}$ [1] (GCE)

Fundoo Tutor Focused. On You.

Answers

Q1) 21 Q2) 98 Q3)6 Q4)(a)$2^4 \times 3 \times 5^2$ (b)30 Q5)5 Q6)(i)2×3^3 (ii)4 Q7)90 Q8) $30\sqrt{2}$ Q9) $30\sqrt{10}$



(iii) HCF and LCM

1. Find the highest common factor (HCF) of 90 and 48. [2]
2. Find the highest common factor (HCF) of 84 and 105. [2]
3. Find the highest common factor (HCF) of 56 and 70. [2]
4. Find the highest common factor (HCF) of 36,63 and 108 [2]
5. Find the lowest common multiple (LCM) of 20 and 24 [2]
6. Find the lowest common multiple (LCM) of 36 and 48. [2]
7. Find the lowest common multiple (LCM) of 24 and 32. [2]
8. Find the lowest common multiple (LCM) of 12,30 and 66 [2]
9. Find the lowest common multiple (LCM) of 48, 72, 108 [2]
10. Find HCF of $12x^{12}\ and\ 16x^{16}$ [2]

Fundoo Tutor
Focused. On You.

Answers

1) 6 2) 21 3)14 4)9 5)120 6)144 7)96 8)660 9) 432 10) $4x^{12}$



(iv) HCF and LCM using prime factorization

1. (a) Write 30 as a product of its prime factors. [2]
   (b) Find the lowest common multiple (LCM) of 30 and 45. [2]

2. (a) Write 90 as a product of prime factors. [2]
   (b) Find the lowest common multiple of 90 and 105. [2]

3. (a) Write 56 as a product of its prime factors. [2]
   (b) Find the lowest common multiple (LCM) of 56 and 42. [2]

4. (a) Write 180 as a product of its prime factors. [2]
   (b) Find the lowest common multiple (LCM) of 180 and 54. [2]

Fundoo Tutor
Focused. On You.



5. Written as the product of prime factors $48 = 2^4 \times 3$.
   (a) Write 60 as the product of prime factors. [2]
   (b) Work out the highest common factor (HCF) of 48 and 60. [2]
   (c) Work out the lowest common multiple (LCM) of 48 and 60. [2]

6. $72 = 2 \times 2 \times 2 \times 3 \times 3$ written as a product of prime factors.
   (a) Write the number 126 as a product of prime factors. [2]
   (b) Find the value of the highest common factor of 72 and 126. [1]
   (c) Find the value of the lowest common multiple of 72 and 126. [2]

7. $P = 2^5 \times 3^3 \times 7 \qquad Q = 540$
   (i) Find the highest common factor (HCF) of P and Q. [2]
   (ii) Find the lowest common multiple (LCM) of P and Q. [2]

8. An integer, *X*, written as a product of its prime factors is $a^2 \times 7^{b+2}$.
   An integer, *Y*, written as a product of its prime factors is $a^3 \times 7^2$.
   The highest common factor (HCF) of *X* and *Y* is 1225.
   The lowest common multiple (LCM) of *X* and *Y* is 42875.
   Find the value of *X* and the value of *Y*. [4]

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



Answer

1) (a) 2 x 3 x 5 (b)90 2)(a) 2 × 3 × 3 × 5 (b)630 3)(a) $2^3 \times 7$ or 2 × 2 × 2 × 7 (b)168

4)(a) 2^2 x 3^2 × 5 (b)540 5) (a) 2^2 × 3 × 5 (b)12 (c) 240 6) (a) 2 × 3 × 3 × 7 (b) 18 (c)504

7) (i) 108 (ii) 30 240 (iii) 98 8) *X* = 8575 , *Y* = 6125

(V) LCM and HCF Word Problems

1. a) Find LCM of 12, 30 and 66. [1]

   b) Three lightships flash simultaneously at 6am. The first lightships flashes every 12 seconds, the second every 30 seconds and the third every 66 seconds.
   At what time will the three lightships next flash together? [1] **4024/01/O/N/03 Q6**

2. Green line busses run every 10min, Red line buses run every 20min and Purple line buses run every 35min. One bus from each line leaves the city centre at 0900. After how many minutes will buses from all three lines next leave the city centre at same time? [2] **4024/01/M/J/05 Q10**

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



3. Three lighthouses flash their lights every 20sec, 30 sec and 50 seconds respectively.
   Given that they flash together at 8pm, when will they flash together next? [2] D1

4. Three bells toll at interval 8min, 15min and 24 min respectively.
   If they toll together at 3pm, at what time will they next toll together again? [2] D1

5. David was trying to sleep one night but there was too much noise around him.
   His clock ticked every 5 seconds,
   a tap was dripping every 7 seconds and
   his pet dog snored every 12 seconds.
   He noticed on his clock that all three events happened together on the stroke of mid night.
   a) After how many seconds will all the three events happen together again? [1]
   b) How many times will it happen together between midnight and One'O clock [2] D1

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



6. Sam has 39 pencils and 26 pens to distribute to his classmates? Each student must receive the same amount of pens and pencils and there will be no pens or pencils left.
   a) What is the greatest number of students in that class? [2]
   b) How many pencils and pens will each student get? [1]

7. A rectangular field measures 450 m by 306 m. The whole field is divided into identical square plots with no land remaining. Find the largest possible side length for the squares. [2]

8. Safoora is buying some apples, bananas and peaches.
   She can buy • packs of 6 apples • packs of 5 bananas • packs of 12 peaches.
   She needs to buy the same number of each fruit.
   Calculate the smallest number of packs of apples, bananas and peaches that she needs to buy[3]

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



9. Car A and car B take part in a race around a circular track.
   One lap of the track measures 7.6km.
   Car A takes 2 minutes and 40 seconds to complete each lap of the track.
   Car B takes 2 minutes and 25 seconds to complete each lap of the track.
   Both cars travel at a constant speed. Both cars start the race from the same position, S, at the same time. Find the time taken when both car A and car B are next at position S at the same time. Give your answer in minutes and seconds. [4] **0580/42/O/N/19**

Fundoo Tutor
Focused. On You.

Answer

Q1) a)660 b)6:11am Q2)after 140 minutes Q3)8: 05 pm Q4)5:00 pm Q5)a)420 seconds b)8 times
Q6)(a) 13 (b) 3 pencils and 2 pens Q7)18 Q8)10,12 and 5 Q9) (b)(i) 77 [min] 20 [s]