MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

REAL NUMBERS

Solved Examples

1. A number when divided by 73 gives 34 as quotient and 23 as remainder. Find the number.

A. 2504

B. 2505

C. 2506

D. 2507

Answer: B

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2. Use Euclid's algorithm of find the HCF of 272 and 1032.

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3. Use Euclid's algorithm to find $HCF(196, 38220)$.

A. 98

B. 196

C. 49

D. none of these

Answer: B

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4. Use Eulid's algortim of find HCF of 1651 and 2032.

Express the HCF in the form 1651m + 2032n.

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5. Show that every positive even integer is of the form $2m$ and that every positive odd integer is of the form $2m + 1$, where m is some integer.

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6. Show the any positive integer is of the form $3m$ or $(3m + 1)$ or $(3m + 2)$ for some integer m.

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7. Show that any positive odd integer of the form $(4m+1)$ or $(4m+3)$ for some integer m.

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8. Show the every positive odd integer is of the form (6m+1) or (6m+3) or (6m+5) for some intger m.

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9. Using Eulid's divison lemma, show that the square of any positive interger is either of the form 3m or (3m+1) for some integer m.

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10. Using Eulids division lemma, show that the cube of any positive integer is of the form 9m , or (9m+1) or (9m+8) for some integer m.

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11. Show that one and only one out of n, $n+1$ and $n+2$ is divisible by 3, where n is any positive integer.

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12. Show that and only one out of n, n+2 , n+4, is divisble by, 3 , where n is any postivie integer.

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13. If n is an odd integer & $n > 1$ then $n^2 - 1$ is always divisible by

A. 8

B. 7

C. 3

D. 9

Answer: A

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14. Show that each of the following sisa composite number .

(i)$5 \times 11 \times 13 + 13$ (ii) $6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$

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15. Any number of the form $4^n, n \neq N$ can never end with the digit

A. 0

B. 4

C. 6

D. None

Answer: A

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16. Show that any number of the form 6^n , where $n \neq N$ can never and with the digit 0.

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17. Find the HCF and LCM of 126 and 156 using prime factorisation method.

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18. Find the HCF of 612 and 1314 using prime factorisation.

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19. The HCF of two numbers is 23 and their LCM is 1449. If one of the number is 161, find the other .

A. 205

B. 208

C. 207

D. 209

Answer: C

20. Given that HCF (252, 594) = 18 find LCM (252 , 594)

A. 8316

B. 9316

C. 4421

D. 6314

Answer: A

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21. Find the simplest form of $\frac{148}{185}$

A. $\frac{4}{5}$

B. $\frac{14}{5}$

C. $\frac{4}{15}$

D. None

Answer: A

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22. Find the HCF and LCM of 108,120 and 252 using prime factorisation method.

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23. Find the largest number which divides 245 and 1037, leaving remainder 5 in each case.

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24. Find the largest number which divides 129 and 545, leaving remainder 3 and 5 respectively.

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25. Find the largest number that will divide 398, 436 and 542 leaving remainders 7,11 and 15 respectively.

A. 17

B. 18

C. 19

D. 20

Answer: A

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26. Two tanks contain 504 and 735 litres of milk respectively. Find the maximum capacity of a container which can measure the milk of either tank an exact number of times.

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27. An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two groups are to march in the same number fo columns. What is the maximum number of columns in which they can march ?

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28. A sweetselller has 420 kaju burfis and 150 badam burfus. He wants to stack them in such a way that each stork has the same number, and they take up the least area of the tray. How many of these can be palced in each stack ? How many stacks are formed ?

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29. Ravin and Sikha drive around a circular sports field. Ravi takes 16 minutes to take one round while sikha completes the round in 20 minutes. If both start at the same point at the same time and go in same direction, after how much time will they meet at the starting point ?

A. 50 minutes

B. 70 minutes

C. 60 minutes

D. 80 minutes

Answer: D

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30. In a school there are two sections, namely A and B, of class X. there are 30 students in section A and 28 students in section B. find the minimum number of books required for their class library so that they can be distributed equally among students of section A ore section B.

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31. Without actual division, show that each of the following rational numbers is a termination decimal. Express each in decimal form.

(i) $\frac{31}{(2^2 \times 5^3)}$ (ii) $\frac{33}{50}$ (iii) $\frac{41}{1000}$ (iv) $\frac{17}{625}$

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32. Without actual division, show that each of the following rational numbers is a nonterminating repeating decimal.

(i) $\frac{121}{(2^3 \times 3^2 \times 7^5)}$ (ii) $\frac{17}{90}$ (iii) $\frac{53}{343}$ (iv) $\frac{66}{180}$

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33. The decimal expansion of the rational number $\frac{43}{(2^4 \times 5^3)}$ will termiate after how many places of decimals.

A. 3 places

B. 5 places

C. 6 places

D. 4 places

Answer: D

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34. Express each of the following as a rational number in simplest form.

(a) $0.\bar{6}$ (ii) $1.\bar{8}$ (iii) $0.1\bar{6}$

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35. Express $0.\overline{32}$ as a fraction in simplest form.

A. $\frac{32}{99}$

B. $\frac{132}{199}$

C. $\frac{132}{999}$

D. None

Answer: A

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36. Express $0.2\overline{54}$ as a fractions in simplest form.

A. 14/65

B. 14/75

C. 14/55

D. none of these

Answer: C

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37. Show that each of the following numbers is rational. What can you say about the prime factors of their denominators ?

(i) 23.123456789 (ii) $32.\overline{123456789}$

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38. Decide whether the number $0.120120012000012\ldots$ Is rational or not.

A. rational

B. irrational

C. can not decide

D. none of these

Answer: B

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39. Show that $\left(2+\sqrt{3}\right)$ is a irrational number.

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40. Show that $2\sqrt{3}$ is irrational.

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41. Show that $\frac{1}{\sqrt{2}}$ is irrational.

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42. Prove that $\left(3+5\sqrt{2}\right)$ is irrational.

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43. Prove that $\left(\sqrt{2}+5\sqrt{2}\right)$ is irrational.

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44. Prove that $\sqrt{p}+\sqrt{q}$ is an irrational, where p and q are primes.

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Exercise 1 A

1. What do you mean by Euclid's divison lemma ?

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2. A number when divided by 61 gives 27 as quotient and 32 as remainder. Find the number. ,

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3. By what number should 1365 be divided to get 31 as quotient and 32 as remainder ?

A. 23

B. 33

C. 43

D. 53

Answer: C

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4. Using Eulid's divison algorithm, find the HCF of

$(i)405 \text{ and } 2520 \quad (ii)504 \text{ and } 1188 \quad (iii)960 \text{ and } 1575$

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5. Show that every positive integer is either even or odd.

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6. Show the every positive odd integer is of the form (6m+1) or (6m+3) or (6m+5) for some intger m.

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7. Show that any positive odd interger of the from (4m +1) or (4m +3) for some integer m.

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8. If n is an integer, then $\left(n^3 - n\right)$ is always divisible by :

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9. Prove that if x and y are both odd positive intergers then $x^2 + y^2$ is even but not divisible by 5.

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10. Use Euclid's algrithm to find HCF of 1190 and 1445. Express the HCF in the form 1190m + 1445m.

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Exercise 1 B

1. Using prime factorisation, find the HCF and LCM of : , (i) 36, 84 (ii) 23,31 (iii) 96,404 (iv) 144,198 (v) 396, 1080 (vi) 1152, 1664 In each case, verify that : HCF $\times$ LCM = product of given number .

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2. Using prime factorisation, find the HCF and LCM of :

, (i) 8,9,25 (ii) 12,15,21 (iii) 17 ,23,29

(iv) 24,36,40 (v) 30,72,432 (vi) 21,28,36,45

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3. The HCF of two numbers is 23 and their LCM is 1449. If one of the number is 161, find the other .

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4. The HCF of two numbers is 145 and their LCM is 2175. if one of the numbers is 725, find the other.

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5. The HCF of two numbers is 18 and their product is 12960. find their LCM.

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6. Is it possible to have two numbers whose HCF is 18 and LCM is 760 ? Given reason .

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7. Find the simplest form of :

(i) $\frac{69}{92}$ (ii) $\frac{473}{645}$ (iii) $\frac{1095}{1168}$ (iv) $\frac{368}{496}$

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8. Find the largest number which divides 438 and 606, leaving remainder 6 in each case.

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9. Find the largest number which divides 320 and 457 , leaving remainders 5 and 7 respectively .

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10. Find the smallest number which when divided by 35,56 and 91 leaves remainders 7.

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11. Find the smallest number which when divided by 28 and 32 leaves remainders 8 and 12 respectively.

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12. Find the smallest number which when increased by 17 is exactly divisible by both 468 and 520.

A. 5663

B. 6663

C. 4663

D. 2663

Answer: C

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13. Find the greatest number of four digits which is exactly divisible by 15, 24 and 36.

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14. Find the greatest four - digits number which when divided by 4,7 and 13 leaves a remainder 3 in

each case.

A. 9831

B. 7831

C. 8831

D. 8821

Answer: A

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15. Find the least number which should be added to 2497 so that the sum is exactly divisible by 5,6,4and

3

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16. Find the least number that will divide 43, 91 and 183 so as to leave the same remainder 4erin each case.

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17. find the greatest number that will divide by 20,25,35 and 40 leaves the same remainder in each case.

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18. In a seminar. the number of participants in Hindi, English and Mathematics are 60,84 and 108 respectively. Find the minimum number of rooms required if, in each room the same number of participants are to be seated and all of them being in the same subject.

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19. Three sets of English, mathematics and science books containing , 336, 240 and 96 books

respectively have to be stacked in such a way that all the books are stored subjectwise and the height of each stack is the same. How many stacks will be there ?

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20. The pieces of timber 42m, 49 m and 63 m long have to be divided into planks of the same lengthd. What is the greated possible length of each plank ? How many stracks will be there ?

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21. Find the greatest possible length which can be used to measure exactly the lengths $7m$, $3m\ 85cm$ and $12m\ 95cm$.

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22. The maximum number of students among them 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and same number of pencils is

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23. The least number of square tiles required to pave the ceiling of a room 15 m 17 cm long and 9 m 2 cm broad is:

A. 804

B. 814

C. 815

D. 840

Answer: B

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24. Three measuring rods are 64 cm, 80 cm and 96 cm in length. Find the least length of cloth that can be meaused an exact number of times, using any of the rods.

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25. An electronic device makes a beep after every 60 seconds. Another device makes a beep after every 62 seconds. They beeped together at 10 a.m . At what time will they beep together at the earliest ?

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26. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they all change simultaneously at 8 a.m . Then at what time will they again change simultanously ?

A. $8:7:22$ hrs

B. $8:7:21$ hrs

C. $8:7:12$ hrs

D. $8:7:11$ hrs

Answer: C

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27. Six bells commence tolling together and toll at interval of 2, 4 , 6, 8 , 10 , 12 minutes respectively . In 30 hours , how many times do they toll together ?

A. 15 times

B. 16 times

C. 14 times

D. 10 times

Answer: B

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Exercise 1 C

1. Without actual division, show that each of the following rational numbers is a terminating decimal. Express each in decimal form.

$\frac{23}{(2^3 \times 5^2)}$ (ii) $\frac{24}{125}$ (iii) $\frac{171}{800}$ (iv) $\frac{15}{1600}$ (v) $\frac{17}{320}$ (vi) $\frac{19}{3125}$

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2. Without actual division, show that each of the following rational numbers is a nonterminating repeating decimal.

(i) $\frac{11}{(2^3 \times 3)}$ (ii) $\frac{73}{(2^2 \times 3^3 \times 5)}$ (iii) $\frac{129}{(2^2 \times 5^3 \times 7^2)}$

(iv) $\frac{9}{35}$

(v) $\frac{77}{210}$ (vi) $\frac{32}{147}$ (vii) $\frac{29}{343}$ (viii) $\frac{64}{455}$

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3. Express each of the following as a fraction in simplest form :

$0.\bar{8}$ (ii) $2.\bar{4}$ (iii) $0.\overline{24}$ (iv) $0.1\bar{2}$

(vi) 0.00608

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Exercise 1 D

1. Define (i) rational numbers (ii) irrational numbers (iii) real numbers.

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2. Classify the following numbers as rational or irrational :

(i) $\frac{27}{7}$ (ii) 3.1416 (iii) π (iv) $3.\overline{142857}$

(v) 5.636363... (vi) 2.040040004.... (vii) 1.535335333.....

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3. Prove that each of the following numbers is irrational

(i) $\sqrt{6}$ (ii) $\left(2-\sqrt{3}\right)$

(iii) $\left(3+\sqrt{23}\right)$ (iv) $\left(2+\sqrt{5}\right)$

(v) $\left(5+3\sqrt{2}\right)$ (iv) $\left(2+\sqrt{5}\right)$

(vii) $\frac{3}{\sqrt{5}}$ (viii) $\left(2-3\sqrt{5}\right)$

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4. Prove that $\frac{1}{\sqrt{3}}$ is irrational.

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5. (i) Given an example of two irrational whose sum is rational.

(ii) Give an example of two irrationals whose product is rational.

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6. State whether the given statement is ture or flase.

(i) The sum of two rationals is always rational. (ii) The product of two rationals is always rational.

(iii) The sum of two irrationals is always an irrational .

(iv) The product of two irrationals is always an

irrational.

(iv) The product of two irrationals is always an irrationals.

(v) The sum of a rational is irrational.

(vi) The product of a rational and an irrational is irrational.

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7. prove that $\left(2\sqrt{3}-1\right)$ is an irrational number.

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8. Prove that $\left(4-5\sqrt{2}\right)$ is an irrational number.

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9. Prove that `(5-2 sqrt3) is an irrraional number.

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10. Prove that $5\sqrt{2}$ is irrational.

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11. Prove that $\frac{2}{\sqrt{7}}$ is irrational.,

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Exercise 1 E

1. Euclid Division lemma

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2. State Fundamental Theorem of Arithmetic.

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3. Express 360 as product of its prime factors.

4. If a and b are two prime numbers then find HCF (a,b)

5. If a and b are two prime numbers then find LCM (a,b)/

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6. If the product of two numbers is 1050 and their HCF is 25, find their LCM.

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7. What is a composite number ?

A. A number having only 2 factors i.e. 1 and itself

B. A number having at least 3 factors is called is called a composite number.

C. A number which is divisible by 2

D. none of these

Answer: B

8. If a and b are relavtively prime then what is their HCF ?

9. If the rational number $\frac{a}{b}$ has a terminating decimal expansion, what is the condition to be

satisfied by b ?

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10. Simplify : $\frac{\left(2\sqrt{45}+3\sqrt{20}\right)}{2\sqrt{5}}$

A. 2

B. 4

C. 8

D. 6

Answer: D

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11. Write the decimal expainsion of $\frac{73}{((2^4 \times 5^3))}$

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12. show that there is no value of n for which $(2^n \times 5^n)$ ends in 5.

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13. Is it possible to have two numbers whose HCF is 25 and LCM is 520 ?

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14. Give an example of two irrationals whose sum is rational.

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15. Give an example of two irrationals whose product is rational.

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16. If a and b are relavtively prime, what is their LCM ?

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17. The LCM of two numbers is 1200. show that the HCF of these numbers cannot be 500. why ?

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18. Express $0.\bar{4}$ as a rational number in simplest form.

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19. Express $0.\overline{23}$ as a rational number is simplest form.

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20. Explain why 0./155001500015 .... Is an irrational number.

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21. Show that $\frac{\sqrt{2}}{3}$ is irrational

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22. A rational number between $\sqrt{3}$ and 2

A. 1.8

B. 0.8

C. 1.66

D. 1.5

Answer: A

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23. Explain why $3.\overline{1416}$ is a rational number

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Multiple Choice Questions Mcq

1. Which of the following is a pair of co-primes ?

A. (14,35)

B. (18,25)

C. (31,93)

D. (32,62)

Answer: B

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2. If a=$\left(2^2 \times 3^3 \times 5^4\right)$ and $b = \left(2^3 \times 3^2 \times 5\right)$ then HCF (a, b) ?

A. 90

B. 180

C. 360

D. 540

Answer: B

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3. HCF of $(2^3 \times 3 \times 5), (2^2 \times 3^3 \times 5^2)$ and $(2^4 \times 3 \times 5^3 \times 7)$ is

A. 30

B. 48

C. 60

D. 105

Answer: C

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4. LCM of $\left(2^3 \times 3 \times 5\right)$ and $\left(2^4 \times 5 \times 7\right)$ is

A. 40

B. 560

C. 1120

D. 1680

Answer: D

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5. The HCF of two numbers is 27 and their LCM is 162. If one of numbers is 54, what is the other number ?

A. 36

B. 45

C. 9

D. 81

Answer: D

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6. The product of two numbers is 16900 and their HCF is 5. The LCM of the number is

A. 8000

B. 1600

C. 320

D. 1605

Answer: C

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7. What is the largest number that divides each one of 1152 and 1664 exactly ?

A. 32

B. 64

C. 128

D. 256

Answer: C

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8. What is the largest number that divides 70 and 125, leaving remainders 5 and 8 respectively ?

A. 13

B. 9

C. 3

D. 585

Answer: A

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9. Find the largest number which divides 245 and 1029 leaving remainder 5 in each case.

A. 15

B. 16

C. 9

D. 5

Answer: B

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10. The simplest from of $\frac{1095}{1168}$ us

A. $\frac{17}{26}$

B. $\frac{25}{26}$

C. $\frac{13}{16}$

D. $\frac{15}{16}$

Answer: D

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11. Property 7 (DIvision Algorithm) If a whole number a is divided by a non-zero whole number b then there exists whole numbers q and r such that $a = bq + r$ whole either .

A. $r = 0$ or $r < b$

B. $0 < r < b$

C. $0 \leq r < b$

D. $0 < r < b$

Answer: C

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12. A number when divided by 143 leaves 31 as remainder . What will be the remainder , when the same number is divided by 13 ?

A. 0

B. 1

C. 3

D. 5

Answer: D

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13. Which of the following is an irrational number?

A. 3.14

B. $3.\overline{14}$

C. $3.1\bar{4}$

D. $3.141141114\ldots$

Answer: D

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14. π is

A. an integer

B. a rational number

C. an irrational number

D. none of these

Answer: C

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15. $2.\overline{35}$ is

A. an integer

B. a rational number

C. an irrational number

D. none of these

Answer: B

Watch Video Solution

16. 2.13113111311113.... Is

A. an integer

B. a rational number

C. an irrational number

D. none of these

Answer: C

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17. The number 3.14636363....is

A. an integer

B. a rational number

C. an irrational number

D. none of these

Answer: B

18. which of the following rational numbers is esxpressible as a terminating decimal ?

A. $\frac{124}{165}$

B. $\frac{131}{30}$

C. $\frac{2075}{625}$

D. $\frac{1625}{462}$

Answer: C

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19. The decimal expansion of the rational number $\frac{37}{2^2 \times 5}$ will termination after

A. one decimal place

B. two decimal places

C. three decimal places

D. four decimal places

Answer: B

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20. The decimal expansion of the number $\frac{4753}{1250}$ will terminate after

A. one decimal place

B. two decimal places

C. three decimal places

D. four decimal places

Answer: D

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21. The number 1.732 is

A. an irrational number

B. a rational number

C. an integer

D. a whole number

Answer: B

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22. p and q are two positive integers such that the least prime factor of p is 3 and the least prime factor of q is 5 . Find the least prime factor of (p + q).

A. 2

B. 3

C. 5

D. 8

Answer: A

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23. $\sqrt{2}$ is

A. a rational number

B. an irrational number

C. a terminating decimal

D. a nonterminating repeating decimal

Answer: B

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24. $\frac{1}{\sqrt{2}}$ is

A. a fraction

B. a rational number

C. an irrational number

D. none of these

Answer: C

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25. $\left(2+\sqrt{2}\right)$ is

A. an integer

B. a rational number

C. an irrational number

D. none of these

Answer: C

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26. Find the least number that is divisible by all the numbers between 1 and 10 (both inclusive).

A. 100

B. 1260

C. 2520

D. 5040

Answer: C

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Test Youself

1. The decimal representation of $\frac{71}{150}$ is

A. a terminating decimal

B. a noterminating, repeating decimal

C. a nonterminating and nonrepeating decimal

D. none of these

Answer: B

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2. which of the following has a terminating decimal expansion ?

A. $\frac{32}{91}$

B. $\frac{19}{80}$

C. $\frac{23}{45}$

D. $\frac{25}{42}$

Answer: B

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3. On dividing a positive integers n by 9, we get 7 as remainder. What will be the remainder if $(3n-1)$ is divided by 9 ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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4. $0.\overline{68} + 0.\overline{73}$ = ?

A. $1.\overline{41}$

B. $1.\overline{42}$

C. $0.\overline{141}$

D. none of these

Answer: B

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5. Show that any number of the form 4^(n),n ne N` can never end with the digit 0.

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6. The HCF of two numbers is 27 and their LCM is 162. if one of numbers is 81, find the other.

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7. Examine whether $\frac{17}{30}$ is a terminating decimal

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8. Find the simplest form of $\frac{148}{185}$

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9. Which of the following numbers are irrational ?

(a) $\sqrt{2}$ (b) $\sqrt[3]{6}$ © 4.142857 (d) $2.\overline{3}$

(e) π (f) $\frac{22}{7}$ (g) 0.232332333... (h) $5.27\overline{41}$

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10. prove that $\left(2+\sqrt{3}\right)$ is irrational.

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11. Find the HCF and LCM of $12, 15, 18, 27$

A. 3 , 540

B. 3 , 270

C. 3, 54

D. none of these

Answer: A

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12. Give an example of two irrational numbers whose sum is rational

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13. Give prime factrisation of 4620.

A. $2^2 \cdot 3 \cdot 5 \cdot 7 \cdot 11$

B. $2^2 \cdot 5 \cdot 7 \cdot 11$

C. $2^3 \cdot 3 \cdot 5 \cdot 7 \cdot 11$

D. None

Answer: A

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14. Find the HCF of 1008 and 1080 by prime factorisation method.

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15. Find the HCF and LCM of $\frac{8}{9}, \frac{10}{29}$ and $\frac{16}{81}$

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16. Find the largest number which divides 546 and 764 leaving remainders 6 and 8 respectively.

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17. Prove that $\sqrt{3}$ is an irrational number.

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18. Show that every positivee odd integer is the form (4q +1) , or (4q +3) for some interger q.

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19. Show that one and only one out of n, $(n+2)$ and $(n+4)$ is divisble by 3, where n is any positive interger.

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20. Show that $\left(4+3\sqrt{2}\right)$ is irrational.

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