



MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

REAL NUMBERS

Others

1. Euclid's Division Lemma



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2. Three sets of English, Hindi and Mathematics books have to be stacked in such a way that all the books are stored topic wise and the height of each stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.



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



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5. Find the HCF and LCM of 144, 180 and 192 by prime factorisation method.



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6. Explain why $7 \cdot 11 \cdot 13 + 13$ and $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$ are composite numbers.



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7. Prove that a positive integer n is prime number, if no prime p less than or equal to \sqrt{n} divides n .



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



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9. prove that there are infinitely many positive integers.



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10. Determine the prime factorization of each of the following numbers: (i) 556920



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11. Express each of the following positive integers as the product of its prime factors.

38255005 (iii) 7429



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12. If a and b are two odd positive integers such that $a > b$, then prove that one of the two numbers $\frac{a + b}{2}$ and $\frac{a - b}{2}$ is odd and the other is even.



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13. Prove that one of every three consecutive positive integers is divisible by 3.



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14. Show that the square of an odd positive integer is of the form $8q + 1$, for some integer q .



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15. Prove that the square of any positive integer is of the form $5q$, $5q + 1$, $5q + 4$ for some integer q .



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16. Prove that if x and y are odd positive integers, then $x^2 + y^2$ is even but not divisible by 4.



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17. Show that one and only one out of n , $n + 2$ or $n + 4$ is divisible by 3, where n is any positive integer.



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18. Prove that $n^2 - n$ divisible by 2 for every positive integer n .



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19. The remainder when the square of any prime number greater than 3 is divided by 6 is



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20. Use Euclid's division algorithm to find the HCF of 4052 and 12576.



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21. Use Euclid's division algorithm to find the HCF of 210 and 55.



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22. If n is a natural number, then $9^{2n} - 4^{2n}$ is always divisible by 5 (b) 13 (c) both 5 and 13 (d) none of these



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23. What can you say about the prime factorisations of the denominators of the following rationals:



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24. If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is an even number (b) an odd number an odd prime number (c) a prime number



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25. There is a circular path around a sports field. Priya takes 18 minutes to drive on round of the field, while Ravish takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the

same direction. After how many minutes will they meet again at the starting point?



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26. A rectangular courtyard is 18m 72cm long and 13m 20cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles.



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27. If the prime factorization of a natural number n is $2^3 \cdot 3^2 \cdot 5^2 \cdot 6$, write the number of consecutive zeros in n .



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28. A circular field has a circumference of 360km. Three cyclists start together and can cycle 48, 60 and 72k, a day, round the field. When will they meet again?



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29. In a morning walk three persons step off together, their steps measure 80 cm, 85 cm and 90 cm respectively. What is the minimum distance each should walk he can cover the distance in complete steps?



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



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31. A merchant has 120 litres of oil of one kind, 180 litres of another kind and 240 litres of third kind. He wants to sell the oil by filling the three kinds of oil in tins of equal capacity. What should be the greatest capacity of such a tin?



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32. Two brands of chocolates are available in packs of 24 and 15 respectively. If I need to buy

an equal number of chocolates of both kinds,
what is the least number of boxes of each kind
I would need to buy?



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33. What is the largest number that divides
626, 3127 and 15628 and leaves remainders of
1,2 and 3 respectively?



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34. Find the greatest number that will divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.



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35. Two tankers contain 850 litres and 680 litres of petrol respectively. Find the maximum capacity of a container which can measure the petrol of either tanker in exact number of times.





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36. Two sets of English and social science books containing 336 and 96 respectively in a library have to be stacked in such a way that an the books are stored topic wise and the height of each stack is the same. Assuming that the books are of the same thickness, determine the number of stacks. What are the characteristics of library?



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37. Find the HCF of 81 and 237 and express it as a linear combination of 81 and 237.



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



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39. Let a, b, c, k be rational numbers such that k is not perfect cube if $a + bk^{\frac{3}{2}} + ck^{\frac{2}{3}} = 0$
prove that $a = b = c = 0$



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40. Prove that for any prime positive integer p , \sqrt{p} is an irrational number.



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41. Let $ABCD$ be a tetrahedron such that the edges AB, AC and AD are mutually perpendicular. Let the area of triangles ABC, ACD and ADB be 3, 4 and 5 sq. units, respectively. Then the area of triangle BCD is

$5\sqrt{2}$ b. 5 c. $\frac{\sqrt{5}}{2}$ d. $\frac{5}{2}$



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42. 15 Pastries and 12 biscuit packets have been donated for a school fete. These are to

be packed in several smaller identical boxes with the same number of pastries and biscuit packets in each. How many biscuit packets and how many pastries will each box contain?



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43. The length, breadth and height of a room are 8m and 25cm, 6m and 75m and 4m 50cm, respectively. Determine the longest rod which can measure the three dimensions of the room exactly.



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44. Let a and b be positive integers. Show that $\sqrt{2}$ always lies between $\frac{a}{b}$ and $\frac{a+2b}{a+b}$.



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45. Any contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the

maximum number of columns in which they can march?



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46. Define HCF of two positive integers and find the HCF of the following pairs of numbers:

(i) 475 and 495

(ii) 75 and 243

(iii) 240

and 6552



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47. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?



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