MATHS

NCERT - NCERT MATHEMATICS(ENGLISH)

REAL NUMBERS

Exercise 1 1

1. Use Euclid's division lemma to show that the cube of any positive integer is of the form $9m$, $9m+1$or $9m+8$.

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2. Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$or $3m+1$for some integer m.[Hint: Let x be any positive integer then it is of the form $3q$, $3q+1$or $3q+2$Now square each of these and show that they can be rewritten in the form $3m$ or $3m+1$].

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3. Use Euclid's division algorithm to find the HCF of

(i) 135 and 225 (ii) 196 and 38220 (iii) 867 and 255

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4. 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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5. Show that any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$, where q is some integer

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Exercise 1 2

1. Given that HCF $(306, 657) = 9$, find LCM $(306, 657)$.

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2. Check whether 6^n can end with the digit 0 for any natural number n.

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

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4. There is a circular path around a sports field. Soma takes 18 minutes to drive one round of the field, while Ravi 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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5. Express each number as a product of its prime factors $(i)140 \quad (ii)156 \quad (iii)3825 \quad (iv)5005 \quad (v)7429$

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6. Find the LCM and HCF of the following pairs of integers and verify that LCM $\times$ HCF $=$ Product of the integers: (a) 26 and 91 (ii) 510 and 92 (iii) 336 and 54

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7. Find the LCM and HCF of the following integers by applying the prime factorisation method: (i) 12, 15 and 21 (ii) 17, 23 and 29 (iii) 8, 9 and 25

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Solved Examples

1. Find the LCM and HCF of 6 and 20 by the prime factorisation method.

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2. Find the HCF of 96 and 404 by the prime factorisation method. Hence, find their LCM.

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3. A sweet seller has 420 kaju barfis and 130 badam barfis. She wants to stack them in such a way that each stack has the same number and they take up the least area of the tray. What is the maximum number of barfis that can be placed in each stack for this purpose?

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4. Consider the numbers 4^n, where n is a natural number. Cheek whether there is any value of n for which 4^n ends with the digit zero.

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5. 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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6. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer.

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7. Use Euclid's algorithm to find the H.C.F. of 4052 and 12576.

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8. Find the HCF and LCM of 6, 72 and 120, using the prime factorisation method.

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9. Prove that $\sqrt{3}$ is irrational.

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

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11. Show that $5 - \sqrt{3}$ is irrational.

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Exercise 1 4

1. Write down the decimal expansions of those rational numbers in Question 1 above which have terminating decimal expansions.

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2. The following real numbers have decimal expansions as given below. In each case, decide whether they are rational or not. If they are rational, and of the form $\frac{p}{q}$, what can you say about the prime factors of q? (i)43.123456789 (ii) 0.120120012000120000 (iii) $43.\overline{123456789}$

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3. Without actually performing the long division, state whether the following rational numbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion:(i) $\frac{13}{3125}$ (ii) $\frac{17}{8}$ (iii) $\frac{64}{455}$ (iv) $\frac{15}{1600}$ (v) $\frac{29}{343}$

(vi) $\frac{23}{2^{35} \hat{} 2}$ (vii) $\frac{129}{2^{25} \hat{} 77^5}$ (viii) $\frac{6}{15}$ (ix) $\frac{35}{50}$ (x) $\frac{77}{210}$

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Exercise 1 3

1. Show that the following numbers are irrational. $\frac{1}{\sqrt{2}}$ (ii) $7\sqrt{5}$

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2. Prove that $3 + 2\sqrt{5}$ is irrationals :

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3. Prove that $\sqrt{5}$ is irrational.

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