MATHS

BOOKS - ZEN MATHS (KANNADA ENGLISH)

REAL NUMBERS

Illustrative Examples

1. Express the following as the product of prime factors.

[A] 420 [B] 800 [C] 2120 [D] 7325

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2. Determine the prime factorisation of each of the following.

[A] 20570 [B] 12673

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3. Why is 3 x 5 x 7 + 7a composite number?

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4. Show that the number of positive primes is infinite.

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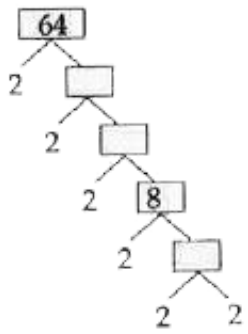
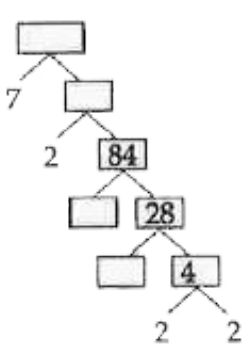
5. Find the missing numbers in the following factor trees.

A]



B]



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6. Find the HCF of 96 and 404 by factorisation method.

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7. Write 96 as the product of prime factors.

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8. Find the HCF and LCM by prime factorisation method.

[A] (336,54) [B] (120,144) [C] (170,408)

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9. Find the HCF of 275,225, and 175.

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10. Find the units place in the expansion of $(25)^8$

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11. Find the units place in the expansion of $(67)^7$

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12. Four bells toll at an interval of 8, 12, 15, and 18 seconds respectively. All the four bells begin to toll together. How many times do they toll together in one hour excluding the one at the start?

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13. 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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Textual Exercises 8 1

1. Use Euclid's algorithm to find the HCF of:

[i] 135 and 225 [ii] 196 and 38220 [iii] 867 and 255

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2. 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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3. 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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4. 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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5. 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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Textual Exercises 8 2

1. Express each number as a product of prime factors

[i] 140 [ii] 156 [iii] 3825 [iv] 5005 [v] 7429

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2. Find the LCM and HCF of the following pairs of integers and verify LCM x HCF = product of two numbers.

[i] 26 and 91 [ii] 510 and 92 [iii] 336 and 54

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3. 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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4. Given that HCF (306,657) = 9, find LCM of (306,657).

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

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6. 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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7. There is a circular path around a sports field. Sonia 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 start- ing point?

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Textual Exercises 8 3

1. Prove that $\sqrt{75}$ is irrational.

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

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3. Prove that $3 + 2\sqrt{5}$ is an irrational number .

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4. Prove that the following are irrationals :

$$\frac{1}{\sqrt{2}}$$

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

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Textual Exercises 8 4

1. (i)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating

decimal expansions.

$$\frac{13}{3125}$$

(ii) Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$$\frac{17}{8}$$

(iii)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$\frac{64}{455}$ (iv)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$$\frac{15}{1600}$$

(v)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating

decimal expansions.

$$\frac{29}{343}$$

(vi)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$$\frac{23}{2^3 5^2}$$

(vii)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$$\frac{129}{2^2 5^7 7^5}$$

(viii) Write down the decimal expansions of those rational num- bers in Question 1 above which

(ix)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$\frac{35}{50}$

(x)Write down the decimal expansions of those rational num- bers in Question 1 above which have terminating decimal expansions.

$\frac{35}{50}$

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$$\frac{35}{50}$$

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3. 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?

43.123456789

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Additional Questions Mcq

1. When 'a' is divided by 3, the values of 'r' are

A. 0 ,1 ,2 ,3

B. ,1 ,2 ,3 ,4

C. 0,1,2

D. 0,1

Answer: c

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2. What is the value of 'q' and 'r' when 10 is divided by 3?

A. q = 3, r = 3

B. = 3, r = 1

C. q = 1,r = 3

D. q= l ,r = 1

Answer: b

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3. For some integer n every odd integer is of the form

A. 2q + 1

B. 2q

C. q

D. q+1

Answer: a

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4. If'm ' is any integer, an even integer will be of the form

A. 2m

B. 2m+1

C. m

D. m+1

Answer: a

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5. For any integer n, 6^n always ends with

A. 2

B. 1

C. 4

D. 6

Answer: d

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6. if p_1 and p_2 are odd prime numbers such that $p_1 > p_2$ then $P_1^2 - P_2^2$ is always

A. even

B. odd

C. negative odd

D. negative even

Answer: a

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7. $n^2 - 1$ is divisible by 8, if n is

A. an even natural number

B. an odd natural number

C. an integer

D. a nutural number

Answer: b

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8. Show that square of any odd integer is of the form 4q + 1 for some integer q.

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9. The factors of 32 (expressed as a product of prime factors) are

A. 2^5

B. 4×2^3

C. 16×2

D. 4×8

Answer: a

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10. If 80 = $2^P \times 5^q$, then p + q =

A. 7

B. 4

C. 6

D. 5

Answer: d

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11. The exponent of 2 in the prime factorisation of 144 is

A. 3

B. 4

C. 5

D. 6

Answer: b

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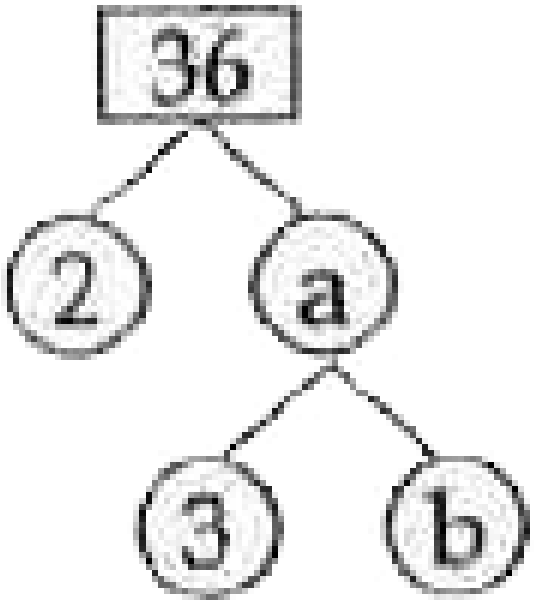
12. In the following factorisation, value of 'b' is



A. 18

B. 6

C. 24

D. 3

Answer: b

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13. For any 'n', $6^n - 5^n$ ends with

A. 1

B. 6

C. 5

D. 4

Answer: a

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14. The units place in the expansion of 6^{35} is

A. 1

B. 2

C. 8

D. 6

Answer: d

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15. $2+\sqrt{3}$ is

A. irrational

B. rational

C. natural

D. integer

Answer: a

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16. If a and b are any two positive integers then HCF (a,b) $\times$ LCM (a,b) is equal to

A. a+b

B. a-b

C. axb

D. a $\div$ b

Answer: c

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17. If the HCF of 72 and 120 is 24, then their LCM is

A. 36

B. 720

C. 360

D. 72

Answer: c

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Additional Questions Very Short Answer Questions

1. What is the HCF of two prime numbers


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2. What are coprimes?


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3. What are twin primes?


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4. How many prime factors are there in the prime factorisation of 120 ?

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5. Find the product of LCM and HCF of numbers 5 and 25

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6. Express $0.\bar{6}$ as a rational number.

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7. Express $0.\overline{47}$ as a rational number

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8. Write the decimal expansion of $\frac{241}{2^3 \times 5^2}$

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9. After how many places of decimal does the decimal expansion of the rational number $\frac{43}{2^4 \times 5^3}$ terminate?

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10. Find 'n' if $n = 2A^3 \times 3^3$

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11. State Euclid's Division lemma.

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12. State the fundamental theorem of arithmetic

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13. Write the condition to be satisfied by q so that the rational number $\frac{p}{q}$ has a terminating decimal expansion.

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14. Write the exponent of 2 in the prime factorisation of 144

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15. If HCF(p, q) = 1, what is the LCM of p and q?

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16. 17 = 6×2+5 is compared with Euclid's Division lemma a = bq +r then which number is representing the remainder

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17. Express the denominator of 23/20 the form of $2^n \times 5^m$ and state whether the given fraction is terminating or non-terminating repeating decimal.

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Additional Questions Short Answer Type 1 Questions

1. Express the following as the product of prime factors.

[A] 96 [B] 720 [C]867 [D] 1771 [E] 10626 [F] 21252 [G] 25935

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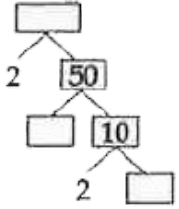
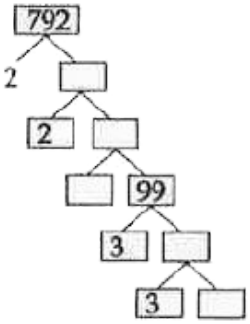
2. Find the missing numbers in the following factor trees.

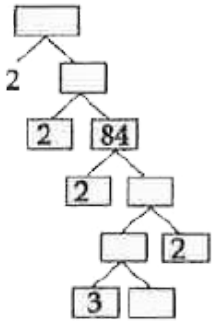
A]


2
50
10
2

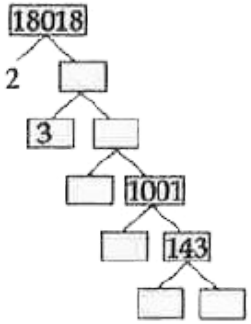
B]

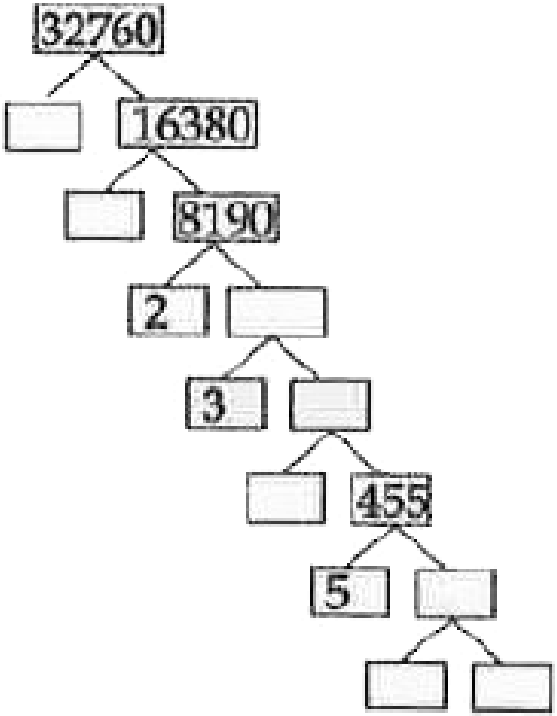

792
2
2
99
3
3

C]


2
2
84
2
2
3

D]


18018
2
3
1001
143


32760
16380
8190
2
3
455
5

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3. Find the LCM and HCF of the following numbers by prime factorisation method.

[A] 6 and 20 [B] 90 and 144 [C] 26 and 91 [D] 92 and 510 [E] 105 and 1515

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4. Find the HCF of these numbers by prime factorisation.

[A] 6,72, and 120 [B] 90 and 144 [C] 40,36,126 [D] 92 and 510 [E] 105 and 1515

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5. Find the units-place digit in the expansion of the following:

[A] $(38)^{20}[B](56)^{74}[C](57)^{40}[D](291)^{2018}$

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6. Find the LCM of 65 and 117

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Additional Questions Short Answer Type 2 Questions

1. In a school, the duration of a period in junior section is 45 minutes and senior section is 1 hour. If the first bell for each section rings at 10:00 a.m., when do the two bells ring together again?

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2. A rectangular field is 150 m x 60 m. Cyclists Joe and Jim start together cycling at speeds 21m/min and 28 m/min respectively. They cycle along the track around the field at the same moment. After how many minutes do they meet again at the starting point?

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3. On a morning walk, three persons walk with steps measuring 45 cm, 42 cm, and 40 cm respectively. What is the minimum distance each should walk to cover the same distance in complete steps?

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4. Prove that the product of any two consecutive positive integers is divisible by 2.

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5. $n^2 - 1$ is divisible by 8, if n is

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6. For any positive integer n, prove that $\left(n^3 - n\right)$ is divisible by 6.

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7. Find the HCF of 24 and 40 by using Euclids division algorithm. Hence find the LCM of HCF (24,40) and 20.

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Additional Questions Long Answer Type Questions

1. Show that the square of any odd integer is of the form $4q + 1$ for any integer q.

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2. Show that the square of any positive odd integer is of the form $4q + 1$ for any integer q.

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3. Prove that $n + n$ is divisible by 2 for any positive integer n.

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

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5. Prove that the square of any positive integer of the form 5q +1 will be in the same form.

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