MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

NUMBERS

Solved Examples

1. If a number 573 xy is divisible by 90, then what is the value of x+y?

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2. The product of two whole numbers is 13. What is the sum of the squares of their reciprocals ?

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3. What per cent is the least rational number of the greatest rational number, if $\frac{1}{2}, \frac{2}{5}, \frac{1}{3}$ and $\frac{5}{9}$ are arranged in ascending order?

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4. The units' digit in the expression $\left(11^1+12^2+13^2+14^4+15^5+16^6\right)$ is

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5. Find the units' digit in the expression $(515)^{31}+(525)^{90}$?

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6. What is the total number of factors of the number $N=4^{11}\times 14^5\times 11^2$?

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7. The numbers 1, 3, 5, .. 25 are multiplied together. The number of zeros at the right end of the product is 0 (b) 1 (c) 2 (d) 3

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8. In a division sum, the remainder is 6 and the divisor is 5 times the quotient and is obtained by adding 2 to thrice of remainder. Find the dividend.

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9. A three digit number 3a5 is added to another 3-digit number 933 to give a 4-digit number 12b8, which is divisible-by 11. Then, find the value of a+b ?

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10. If $\frac{1}{891} = 0.001122334455667788 99\ldots\ldots$ Then what is the value of $\frac{198}{891}$?

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11. What is the value of $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + 5 + 5 + 5$?

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Question Bank

1. If the remainder obtained by subtracting a number from its own square is 4 times the number, what is the number?

A. 4

B. 3

C. 6

D. 5

Answer: D

2. The difference between the squares of two consecutive odd integers is always divisible by 3 (b) 6 (c) 7 (d) 8

A. 8

B. 7

C. 6

D. 3

Answer: A

3. A number when divided by 296 leaves 75 as remainder. If the same number is divided by 37, thé remainder obtained is

A. 2

B. 1

C. 11

D. 8

Answer: B

4. A number when divided by 5 leaves 3 as remainder. If the square of the same number is divided by 5, the remainder obtained is,

A. 9

B. 4

C. 1

D. 3

Answer: B

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5. When N is divided by 4, the remainder is 3. What is the remainder when 2N is divided by 4.

A. 2

B. 3

C. 4

D. 8

Answer: A

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6. The units' digit in the expression $\left(11^1+12^2+13^3+14^4+15^5+16^6\right)$ is

A. 1

B. 7

C. 9

D. 0

Answer: B

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7. The digit in the units place of $\left[(251)^{98}+(21)^{29}-(106)^{100}+(705)^{35}-16^4+259\right]$ is 1 (b) 4 (c) 5 (d) 6

A. 1

B. 4

C. 5

D. 6

Answer: B

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8. The number of digits in $\left(48^4 \times 5^{12}\right)$ is

A. 18

B. 16

C. 14

D. 12

Answer: B

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9. Which one of the following is a rational number?

A. $\left(\sqrt{2}\right)^2$

B. $2\sqrt{2}$

C. $2+\sqrt{2}$

D. $\frac{\sqrt{2}}{2}$

Answer: A

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10. If x is a rational number and y is an irrational number, then both $x+y\,and\,xy$ are necessarily rational both $x+y\,and\,xy$ are necessarily irrational xy is necessarily irrational, but $x+y$ can

be either rational or irrational $x + y$ is necessarily irrational, but xy can be either rational or irrational

A. Both x + y and xy are necessarily irrational.

B. Both x + y and xy are necessarily rational.

C. xy is necessarily irrational, but x + y can be either rational or irrational.

D. x+y is necessarily irrational, but xy can be either rational or irrational.

Answer: D

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11. Consider the following statements :

A number $a_1a_2a_3a_4a_5a_6$ is divisible by 11 if

1. $(a_1 + a_3 + a_5) - (a_2 + a_4 + a_6) = 0$

2. $(a_1 + a_3 + a_5) - (a_2 + a_4 + a_6)$ is divisible by 11

Which of these statements is/are correct?

A. 1 alone

B. 2 alone

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

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12. The number 111,111,111,111 is divisible by

A. 9 and 11

B. 5 and 11

C. 3 and 9

D. 3 and 11

Answer: D

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13. If $1^2 + 2^2 + 3^2 + ... + 512^2 = m,$ then $2^2 + 4^2 + 6^2 + ... + 1024^2$ is equal to

A. 3m

B. 4m

C. m^2

D. m^3

Answer: B

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14. If m and n are positive integers, then the digit in the units place of $5^n + 6^m +$ is always 1 (b) 5 (c) 6 (d) $n + m$

A. 1

B. 5

C. 6

D. n+m

Answer: A

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15. What number 'should replaced M in this multiplication problem ? 3 M 4 $\frac{4}{1216}$

A. 0

B. 5

C. 7

D. 8

Answer: A

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16. m'and n are integers and $\sqrt{mn} = 10$. Which of the following cannot be a value of m+n ?

A. 25

B. 52

C. 101

D. 50

Answer: D

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17. If a six digit number $93p25q$ is divisible by 88, then the values of p and q are respectively

A. 2 and 8

B. 8 and 2

C. 8 and 6

D. 6 and 8

Answer: C

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18. What is, the 25th digit to the right of the decimal point in the decimal of $\frac{6}{11}$?

A. 5

B. 3

C. 4

D. 6

Answer: A

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19. A number when divided by the sum of 555 and 445 gives two times their difference as quotient and 30 as the remainder. The number is

A. 220030

B. 22030

C. 1220

D. 1250

Answer: A

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20. There are four prime numbers written in ascending order. The product of the first three is 385 and that of last three is 1001. Find the first number.

A. 5

B. 7

C. 11

D. 17

Answer: A

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21. What is the highest power of 5 that divides

$90 \times 80 \times 70 \times 60 \times 50 \times 40 \times 30 \times 20 \times 10$

A. 10

B. 12

C. 14

D. 15

Answer: A

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22. Five digit numbers are formed such that either all the digits are even or all the digits are odd. If no digit is allowed to be repeated in one number find the difference between the maximum possible. number with odd-digits and the minimum possible number with even digits

A. 77063

B. 79999

C. 72841

D. 86420

Answer: A

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23. Which one of the following numbers will completely divide $\left(3^{25}+3^{26}+3^{27}+3^{28}\right)$?

A. 11

B. 16

C. 25

D. 30

Answer: D

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24. A number when divided successively by 4 and 5 leaves remainders 1 and 4 respectively. When it is successively divided by 5 and 4, then the respective. remainders will be

A. 1,2

B. 2,3

C. 3,2

D. 4,1

Answer: B

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25. If $2.5252525\ldots\ldots = \frac{p}{q}$ (in the lowest form) then what is the value of $\frac{q}{p}$?

A. 0.4

B. 0.42525

C. 0.0396

D. 0.396

Answer: D

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26. What is the sum of two numbers whose difference is 45, and the quotient of the greater number by the lesser number is 4?

A. 100

B. 90

C. 80

D. 75

Answer: D

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27. The number of factors of a number $N = 2^3 \times 3^2 \times 5^3$ is

A. 18

B. 45

C. 48

D. 9

Answer: C

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28. $P = 441 \times 484 \times 529 \times 576 \times 625$. The total number of factors are

A. 607

B. 5706

C. 1024

D. 6075

Answer: D

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29. If $N = 12^3 \times 3^4 \times 5^2$, then the total number of even factors of N is

A. 25

B. 121

C. 144

D. 84

Answer: C

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30. The units' digit of the sum $1+9+9^2+\ldots\ldots 9^{1006}$ is

A. 2

B. 1

C. 9

D. 0

Answer: D

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Self Assessment Sheet

1. $16^5 + 2^{15}$ is divisible by

A. 31

B. 13

C. 27

D. 33

Answer: D

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2. Find the number of divisors of 10800.

A. 57

B. 60

C. 72

D. none of these

Answer: B

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3. The units digit of the expression $125^{813} \times 553^{3703} \times 4532^{828}$ is

A. 4

B. 2

C. 0

D. 5

Answer: C

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4. If $M = 2^2 \times 3^5, N = 2^3 \times 3^4$, then the number of factors of N that are common with factors of M is

A. 8

B. 5

C. 18

D. 15

Answer: D

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5. Find the greatest number by which the expression $7^{2n} - 3^{2n}$ is always exactly divisible.

A. 4

B. 10

C. 20

D. 40

Answer: D

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6. Given that $\left(1^2+2^2+3^2+\ldots..+10^2\right)=385$, the value of $\left(2^2+4^2+6^2+\ldots..+20^2\right)$ is equal to

A. 770

B. 1540

C. 1155

D. $(385)^2$

Answer: B

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7. There is one number which is formed by writing one digit 6 times (e.g. 111111, 444444 etc.). Such number is always divisible by

A. 7

B. 11

C. 13

D. all of these

Answer: D

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8. The number of integers x for which the number $\sqrt{x^2+x+1}$ is rational is:

A. infinite

B. one

C. two

D. three

Answer: C

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9. A number divided by 296 leaves 75 as remainder, If the same number is divided by 37, the remainder obtained is

A. 2

B. 1

C. 11

D. 8

Answer: B

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10. How many prime factors are there in the expression $(12)^{43} \times (34)^{48} \times (2)^{57}$?

A. 282

B. 237

C. 142

D. 61

Answer: A

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