



# MATHS

# NCERT - FULL MARKS MATHEMATICS(TAMIL)

# **BASIC ALGEBRA**



1. Solve  $\left|2x-17
ight|=13$  for x



**2.** Solve 3|x - 2| + 7 = 19 for x.



**3.** Solve 
$$|2x - 3| = |x - 5|$$

**View Text Solution** 

**4.** Solve 
$$|x-9| < 2$$
 for x

View Text Solution

5. Solve 
$$\left|rac{2}{x-4}
ight|>1, x
eq 4$$

**6.** Our monthly electricity bill contains a basic charge, which does not change with number of units used, and a charge that depends only on how many units we use. Let us say electricity board charges Rs. 110 as basic charge and charges Rs. 4 for each unit we use. If a person wants to keep his electricity bill below Rs. 250, then what should be his electricity usage?



7. Solve 
$$3x-5 \leq x+1$$
 for x.

8. Solve the following system of linear inequalities.

 $3x - 9 \ge 0, 4x - 10 \le 6.$ 



**9.** A girl A is reading a book having 446 pages and she has already finished reading 271 pages. She wants to finish reading this book within a week. What is the minimum number of pages she should read per day to complete reading the book within a week?





## View Text Solution

11. Find the complete set of values of a for which the quadratic  $x^2 - ax + a + 2 = 0$  has equal roots.

## View Text Solution

12. Find the number of solutions of  $x^2+|x-1|=1$ 

13. Solve 
$$3x^2 + 5x - 2 \le 0$$
.  
View Text Solution  
14. Solve  $\sqrt{x + 14} < x + 2$   
View Text Solution  
15. Solve the equation  $\sqrt{6 - 4x - x^2} = x + 4$   
View Text Solution  
16. Find a quadratic polynomial  $f(x)$  such that

$$f(0) = 1, f(-2) = 0$$
 and  $f(1) = 0.$ 



17. Construct a cubic polynomial function having zeros at

$$x=rac{2}{5},1+\sqrt{3}$$
 such that  $f(0)=\ -8$ 

View Text Solution

18. Prove that ap+q=0 if  $f(x)=x^3-3px+2q$  is divisible by  $g(x)=x^2+2ax+a^2$ 

## **View Text Solution**

19. Use the method of undertermined coefficients to find

the sum of  $1+2+3+\ldots\ldots+(n-1)+n, n\in\mathbb{N}$ 



 $(x-1)^3(x+1)^2(x+5)=0$  and state their multiplicity.



**21.** Solve 
$$x=\sqrt{x+20}$$
 for  $x\in R$ 

View Text Solution

22. The equations  $x^2 - 6x + a = 0$  and  $x^2 - bx + 6 = 0$ 

have one root in common. The other root of the first and

the second equations are integers in the ratio 4:3. Find the

common root.







**31.** Find the logarithm of 1728 to the base  $2\sqrt{3}$ .

View Text Solution
<b>32.</b> If the logarithm of 324 to base a is 4, then find a.
View Text Solution
33. Prove $\mathrm{log} rac{75}{16} - 2\mathrm{log} rac{5}{9} + \mathrm{log} rac{32}{243} = \mathrm{log}  2$
View Text Solution
<b>34.</b> If $\log_2 x + \log_4 x + \log_{16} x = rac{7}{2}$ find the value of x.



35. Solve 
$$x^{\log_3 x} = 9$$

**D** View Text Solution

**36.** Compute 
$$\log_3 5 \log_{25} 27$$
.

**37.** Given that  $\log_{10} 2 = 0.30103, \log_{10} 3 = 0.47712$ 

(approximately), find the number of digits in  $2^8.3^{12}$ .



**1.** Classify each element of 
$$\left\{\sqrt{7},\, rac{-1}{4},\, 0,\, 3.14,\, 4,\, rac{22}{7}
ight\}$$
 as a

member of  $\mathbb{N},\mathbb{Q},\mathbb{R}-\mathbb{Q}$  or  $\mathbb{Z}$ 

**View Text Solution** 

2. Are there two distinct irrational numbers such that their

difference is a rational number? Justify.

View Text Solution

**3.** Find two irrational numbers such that their sum is a rational number. Can you find two irrational numbers

whose product is a rational number.



2. Solve for x:

$$|4x-5|\geq -2$$

3. Solve for x:

$$\left|3-\frac{3}{4}x\right| \leq \frac{1}{4}$$

View Text Solution

**4.** Solve for x:

$$|x| - 10 < -3$$

![](_page_15_Picture_8.jpeg)

5. Solve  $rac{1}{|2x-1|} < 6$  and express the solution using the

interval notation.

6. Solve  $-3|x|+5\leq -2$  and graph the solution set in a

number line.

View Text Solution

7. Solve  $2|x+1|-6\leq 7$  and graph the solution set in a

number line.

![](_page_16_Picture_8.jpeg)

**8.** Solve 
$$rac{1}{5}|10x-2|<1.$$

View Text Solution

9. Solve  $|5x-12|<\ -2$ 

View Text Solution

## Exercise 2 3

**1.** Represent the following inequalities in the interval notation:

 $x \geq \ -1 ext{ and } x < 4$ 

![](_page_17_Picture_7.jpeg)

**2.** Represent the following inequalities in the interval notation:

 $x \leq 5$  and  $x \geq \, -3$ 

**D** View Text Solution

**3.** Represent the following inequalities in the interval notation:

 $x < \ -1 ext{ or } x < 3$ 

**4.** Represent the following inequalities in the interval notation:

-2x > 0 or 3x-4 < 11

View Text Solution

5. Sovle 23x < 100 when (i) x is a natural number (ii) x is

an integer.

View Text Solution

6. Solve  $-2x - \ge 9$  when (i) x is real number (ii) x is an

integer (iii) x is a natural number.

7. Solve 
$$rac{3(x-2)}{5} \leq rac{5(2-x)}{3}$$

**View Text Solution** 

\_

8. Solve 
$$rac{5-x}{3} < rac{x}{2} - 4$$

View Text Solution

**9.** To secure A grade one must obtain an average of 90 marks or more in 5 subjects each of maximum 100 marks. If one scored 84, 87, 95, 91 in first four subjects, what is the minimum mark one scored in the fifth subject to get A grade in the course?

![](_page_21_Picture_0.jpeg)

**10.** A manufacturer has 600 litres of a 12 percent solution of acid. How many litres of a 30 percent acid solution must be added to it so that the acid content in the resulting mixture will be more than 15 percent but less than 18 percent?

![](_page_21_Picture_2.jpeg)

11. Find all pairs of consecutive odd natural numbers both

of which are larger than 10 and their sum is less than 40.

![](_page_21_Picture_5.jpeg)

12. A model rocket is launched from the ground. The height h reached by the rocket after t seconds from lift off is given by  $h(t) = -5t^2 + 100t$ ,  $0 \le t \le 20$ . At what time the rocket is 495 feet above the ground?

**View Text Solution** 

**13.** A plumber can be paid according to the following schemes. In the first scheme he will be paid rupees 500 plus rupees 70 per hour, and in the second scheme he will paid rupees 120 per hour. If he works x hours, then for what value of x does the first scheme give better wages?

![](_page_22_Picture_3.jpeg)

**14.** A and B are working on similar jobs but their annual salaries differ by more than Rs. 6000. If B earns rupees 27000 per month, then what are the possibilities of A's salary per month?

View Text Solution	

Exercise 2 4

**1.** Construct a quadratic equation with roots 7 and -3.

![](_page_23_Picture_4.jpeg)

**2.** A quadratic polynomial has one of its zeroes  $1+\sqrt{5}$  and

it satisfies p(1)=2. Find the quadratic polynomail.

![](_page_24_Picture_0.jpeg)

**3.** If  $\alpha$  and  $\beta$  are the roots of the quadratic equation  $x^2 + \sqrt{2}x + 3 = 0$ , form a quadratic polynomial with zeroes  $\frac{1}{\alpha}, \frac{1}{\beta}$ .

**View Text Solution** 

**4.** Find the condition that one of the roots of  $ax^2 + bx + c$  may be (i) negative of the other (ii) thrice the other (iii) reciprocal of the other.

5. If the equations  $x^2 - ax + b = 0$  and  $x^2 - ex + f = 0$ have one root in common and if the second equation has equal roots, then prove that ae = 2(b + f).

View Text Solution

**6.** Discuss the nature of roots of  $-x^2 + 3x + 1 = 0$ 

View Text Solution

7. Discuss the nature of roots of  $4x^2 - x - 2 = 0$ ,

**8.** Discuss the nature of roots of  $9x^2 + 5x = 0$ 

![](_page_26_Figure_1.jpeg)

**9.** Without sketching the graphs, find whether the graphs of the following functions will intersects the x-axis and if so in how many points.

$$y = x^2 + x + 2$$

View Text Solution

**10.** Without sketching the graphs, find whether the graphs of the following functions will intersects the x-axis and if

so in how many points.

$$y = x^2 - 3x - 7$$

View Text Solution

**11.** Without sketching the graphs, find whether the graphs of the following functions will intersects the x-axis and if so in how many points.

$$y = x^2 + 6x + 9$$

View Text Solution

12. Write  $f(x) = x^2 + 5x + 4$  in completed square form.

1. Solve 
$$2x^2 + x - 15 \leq 0$$

View Text Solution

**2.** Solve 
$$-x^2+3x-2\geq 10$$

View Text Solution

## Exercise 2 6

1. Find the zeros of the polynomial function  $f(x) = 4x^2 - 25.$ 

![](_page_28_Picture_7.jpeg)

![](_page_29_Picture_0.jpeg)

**3.** Find the real roots of  $x^4 = 16$ 

View Text Solution

**4.** Solve 
$$(2x + 1)^2 - (3x + 2)^2 = 0$$

**1.** Factorize :  $x^4 + 1$ .

View Text Solution

![](_page_30_Figure_3.jpeg)

 $3x^3 + 8x^2 + 8x + a$ , then find the value of a.

## View Text Solution

## Exercise 28

**1.** Find al values of x for which 
$$rac{x^3(x-1)}{(x-2)}>0$$

![](_page_31_Picture_0.jpeg)

View Text Solution

2. Resolve the following rational expressions into partial

fractions:

 $\frac{1}{x^2-a^2}$ 

### fractions:

$$\frac{3x+1}{(x-2)(x+1)}$$

**View Text Solution** 

4. Resolve the following rational expressions into partial

fractions:

$$\frac{x}{(x^2+1)(x-1)(x+2)}$$

![](_page_32_Picture_7.jpeg)

5. Resolve the following rational expressions into partial

fractions:

![](_page_33_Figure_0.jpeg)

![](_page_33_Picture_1.jpeg)

fractions:

$$\frac{\left(x-1\right)^2}{x^3+x}$$

fractions:

$$\frac{x^2+x+1}{x^2-5x+6}$$

View Text Solution

9. Resolve the following rational expressions into partial

fractions:

 $\frac{x^3 + 2x + 1}{x^2 + 5x + 6}$ 

![](_page_34_Picture_7.jpeg)

fractions:

$$\frac{x+12}{\left(x+1\right)^2(x-2)}$$

View Text Solution

11. Resolve the following rational expressions into partial

fractions:

$$\frac{6x^2 - x + 1}{x^3 + x^2 + x + 1}$$

![](_page_35_Picture_7.jpeg)

12. Resolve the following rational expressions into partial

fractions:

![](_page_36_Figure_0.jpeg)

$$\frac{7+x}{(1+x)(1+x^2)}$$

1. Solve 
$$\displaystyle rac{x^2-4}{x^2-2x-15} \leq 0$$

## Exercise 2 11

1. Simplify:

 $(125)^{rac{2}{3}}$ 

![](_page_37_Picture_3.jpeg)

## 2. Simplify:

 $16^{\frac{-3}{4}}$ 

![](_page_37_Picture_6.jpeg)

3. Simplify:  

$$(-1000)^{\frac{-2}{3}}$$
  
View Text Solution  
4. Simplify:  
 $(3^{-6})^{\frac{1}{3}}$   
View Text Solution

## 5. Simplify:

$$\frac{27^{\frac{-2}{3}}}{27^{\frac{-1}{3}}}$$

**6.** Evaluate 
$$\left( \left( (256)^{-1/2} \right)^{\frac{-1}{4}} \right)^3$$

## **View Text Solution**

7. If 
$$\left(x^{1/2}+x^{-1/2}
ight)^2=9/2$$
, then find the value of  $\left(x^{1/2}-x^{-1/2} ext{ for }x>1
ight).$ 

View Text Solution

8. Simplify and hence find the value of 
$$n: 3^{2n}9^23^{-n}/3^{3n} = 27.$$

9. Find the radius of the spherical tank whose volume is

 $32\pi/3$  units.

**View Text Solution 10.** Simplify by rationalising the denominator:  $\frac{7+\sqrt{6}}{3-\sqrt{2}}$ **View Text Solution** 11. Simplify  $rac{1}{3-\sqrt{8}} - rac{1}{\sqrt{8}-\sqrt{7}} + rac{1}{\sqrt{7}-\sqrt{6}} - rac{1}{\sqrt{6}-\sqrt{5}} + rac{1}{\sqrt{5}-2}$ **View Text Solution** 

12. If 
$$x = \sqrt{2} + \sqrt{3}$$
 find  $\frac{x^2 + 1}{x^2 - 2}$   
View Text Solution  
Exercise 2 12  
1. Let  $b > 0$  and  $b \neq 1$ . Express  $y = b^x$  in logarithmic form.

Also state the domain and range of the logarithmic function.

![](_page_41_Picture_2.jpeg)

**2.** Compute 
$$\log_9 27 - \log_{27} 9$$
.

![](_page_42_Figure_0.jpeg)

![](_page_42_Figure_1.jpeg)

**4.** Solve 
$$\log_4 2^{8x} = 2^{\log_2 8}$$

View Text Solution

5. Solve 
$$\log_2 x - 3 \log_{rac{1}{2}} x = 6$$

6. Solve 
$$\log_{5-x}ig(x^2-6x+65ig)=2$$

![](_page_43_Figure_1.jpeg)

## Exercise 2 13

1. If  $|x+2| \leq 9$  then x belongs to

A. 
$$(-\infty, -7)$$

B.[-11,7]

C. 
$$(\,-\infty,\,-7)\cup [11,\infty)$$

D. (-11, 7)

#### **Answer: B**

![](_page_43_Picture_9.jpeg)

![](_page_44_Picture_0.jpeg)

2. Given that x, y and b are real numbers x < y, b > 0,

### then

A. 
$$xb < yb$$
  
B.  $xb > yb$   
C.  $xb \leq yb$   
D.  $rac{x}{b} \geq rac{y}{b}$ 

### Answer: A

![](_page_44_Picture_5.jpeg)

- **3.** If  $rac{|x-2|}{x-2} \geq 0$ , then x belongs to
  - A.  $[2,\infty)$
  - $\mathsf{B.}\left(2,\infty
    ight)$
  - $\mathsf{C.}\,(\,-\infty,\,2)$
  - D.  $(-2,\infty)$

#### **Answer: A**

**D** View Text Solution

**4.** The solution of 5x-1<24 and 5x+1>~-24 is

A. (4, 5)

B. 
$$(-5, -4)$$
  
C.  $(-5, 5)$   
D.  $(-5, 4)$ 

### Answer: C

**O** View Text Solution

5. The solution set of the following inequality  $|x-1| \ge |x-3|$  is

A. [0, 2]

 $\mathsf{B}.\left[2,\infty\right)$ 

C.(0,2)

## D. $(-\infty,2)$

### Answer: B

![](_page_47_Figure_2.jpeg)

![](_page_47_Figure_3.jpeg)

A. 16

B. 18

C. 9

D. 12

**Answer: B** 

![](_page_47_Picture_9.jpeg)

7. The value of  $\log_3 \frac{1}{81}$  is

 $\mathsf{A.}-2$ 

B.-8

 $\mathsf{C}.-4$ 

D.-9

#### Answer: C

**View Text Solution** 

**8.** If  $\log_{\sqrt{x}} 0.25 = 4$  then the value of x is

A. 0.5

B. 2.5

C. 1.5

D. 1.25

Answer: A

View Text Solution

**9.** The value of  $\log_a b \log_b c \log_a$  is

A. 2

B. 1

C. 3

D. 4

Answer: B
View Text Solution
<b>10.</b> If 3 is the logarithm of 343, then the base is
A. 5
B. 7
C. 6
D. 9
Answer: B
View Text Solution

11. Find a so that the sum and product of the roots of the equation  $2x^2 + (a-3)x + 3a - 5 = 0$  are equal is A.1

B. 2

C. 0

D. 4

### Answer: B

![](_page_51_Picture_5.jpeg)

12. If a and b are the roots of the equation  $x^2 - kx + 16 = 0$  and satisfy  $a^2 + b^2 = 32$  then the value

of k is

A. 10

B.-8

C. -8, 8

D. 6

### Answer: C

View Text Solution

13. The number of solutions of  $x^2 + |x - 1| = 1$  is

A. 1

B. 0

C. 2

D. 3

Answer: C

**View Text Solution** 

14. The equation whose roots are numerically equal but opposite in sign to the roots of  $3x^2 - 5x - 7 = 0$  is

A. 
$$3x^2 - 5x - 7 = 0$$

B. 
$$3x^2 + 5x - 7 = 0$$

C. 
$$3x^2-5x+7=0$$

D.  $3x^2 + x - 7$ 

### Answer: B

## View Text Solution

15. If 8 and 2 are the roots of  $x^2 + ax + c = 0$  and 3,3 are the roots of  $x^2 + dx + b = 0$ , then the roots of the equation  $x^2 + ax + b = 0$  are

#### A. 1,2

B. -1, 1

C. 9,1

D. -1, 2

Answer: C

![](_page_54_Picture_8.jpeg)

16. If a and b are the real roots of the equation  $x^2 - kx + c = 0$ , then the distance between the points (a,0) and (b,0) is

A. 
$$\sqrt{k^2-4c}$$
  
B.  $\sqrt{4k^2-c}$   
C.  $\sqrt{4c-k^2}$ 

D.  $\sqrt{k-8c}$ 

#### **Answer: A**

![](_page_55_Picture_3.jpeg)

17. If 
$$\displaystyle rac{kx}{(x+2)(x-1)} = \displaystyle rac{2}{x+2} + \displaystyle rac{1}{x-1}$$
 the the value of

k is

A. 1

B. 2

C. 3

D. 4

### Answer: C

18. If 
$$\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$$
, then the value of A+B is

A. 
$$\frac{-1}{2}$$
  
B.  $\frac{-2}{3}$   
C.  $\frac{1}{2}$   
D.  $\frac{2}{3}$ 

Answer: A

View Text Solution

19. The number of roots of  $\left(x+3
ight)^4+\left(x+5
ight)^4=16$  is

A. 4

B. 2

C. 3

D. 0

### Answer: A

![](_page_58_Picture_2.jpeg)

**20.** The value of  $\log_{11} 13$ .  $\log_{13} 15$ .  $\log_{15} 27$ .  $\log_{27} 81$  is

A. 1

B. 2

C. 3

D. 4

Answer: D

![](_page_58_Picture_9.jpeg)