

Algebra



G. V. V. Sharma

Associate Professor,
Department of Electrical Engineering,
IIT Hyderabad

ABOUT THIS BOOK

This book introduces quadratic equations, complex numbers and other concepts in algebra. All problems in the book are from NCERT mathematics textbooks from Class 9-12. Exercises are from CBSE and JEE exam papers.

There is no copyright, so readers are free to print and share.

April 14, 2025

Github: <https://github.com/gadepall/algebra>

License: <https://creativecommons.org/licenses/by-sa/3.0/>

and

<https://www.gnu.org/licenses/fdl-1.3.en.html>

1 **Integers**

4

1 INTEGERS

1.0.1 Do the following addition through a C program

$$17 + 23$$

Solution:

```
//Code by GVV Sharma
//Adding two integers
//April 14, 2025
#include <stdio.h>

//begin main function
int main(void)
{
    //Declaring integers
    int a = 17, b = 23;
    //printing the sum
    printf("%d\n",a+b);
    return 0;
}
//end main function
```

1.0.2 Do the following subtraction through a C program

$$7 - 9$$

Solution:

```
//Code by GVV Sharma
//Adding negative integer
//April 14, 2025
#include <stdio.h>

//begin main function
int main(void)
{
    //Declaring integers
    int a = 7, b = 9;
    //printing the difference
    printf("%d\n",a-b);
    return 0;
}
//end main function
```

Compute the following

$$1.0.3 \quad (-75) + 18$$

$$1.0.4 \quad 19 + (-25)$$

$$1.0.5 \quad 27 + (-27)$$

$$1.0.6 \quad (-20) + 0$$

$$1.0.7 \quad (-35) + (-10)$$

$$1.0.8 \quad (-10) + 3$$

$$1.0.9 \quad 17 - (-21)$$

In a quiz, team A scored $a_1 = -40, a_2 = 10, a_3 = 0$ and team B scored $b_1 = 10, b_2 = 0, b_3 = -40$ in three successive rounds.

1.0.10 If the total scores are

$$a = a_1 + a_2 + a_3 \quad (1.0.10.1)$$

$$b = b_1 + b_2 + b_3 \quad (1.0.10.2)$$

which team scored more?

Solution:

```
//Code by Harini
//February 23, 2025
//Revised by GVV Sharma
//April 14, 2025
//add two sets of numbers and compare
#include <stdio.h>

//begin main function
int main() {
    // first team scores
    int a1=-40,a2=10,a3=0;
    // second team scores
    int b1=10,b2=0,b3=-40;

    //declaring scores variables
    int a,b;
    //sum of scores
    a=a1+a2+a3;
    b=b1+b2+b3;
    //comparing scores
    if (a>b){
        printf("a scored more\n");
    }
    else if (a<b){
        printf("b scored more\n");
    }
    else {
        printf("they are equal\n");
    }
}
```

```
//end comparison
    return 0;
}
//end main function
```

1.0.11 Write a function to compare the final scores. Check for the cases when $a = -40, b = -40$; $a = 30, b = 20$; $a = -20, b = -10$.

Solution:

```
//code by harini
//feb 23 2025
//code by GVV Sharma
//April 14 2025
//function to compare two numbers

#include <stdio.h>

//function to compare the numbers a and b
void compare(int a,int b){
    if (a>b){
        printf("a scored more\n");
    }
    else if (a<b){
        printf("b scored more\n");
    }
    else {
        printf("they are equal\n");
    }
}

//end function to compare the numbers a and b
//begin main function
int main() {
    int a=-40,b=-40;

    //call the function to compare the numbers
    compare(a,b);

    return 0;
}
//end main function
```

1.0.12 Use arrays and a for loop to evaluate

$$a = \sum_{i=0}^2 a_i \quad (1.0.12.1)$$

$$b = \sum_{i=0}^2 b_i \quad (1.0.12.2)$$

Solution:

```

//code by harini
//feb 23 2025
//revise by GVV Sharma
//April 14 2025
//compares sum of 2 arrays using a for loop
#include <stdio.h>

//compare function
void compare(int a,int b){
    if (a>b){
        printf("a scored more\n");
    }
    else if (a<b){
        printf("b scored more\n");
    }
    else {
        printf("they are equal\n");
    }
}

//end compare function
//begin main function
int main() {
    //Declaring arrays
    int a1[]={-40,10,0};
    int b1[]={10,0,-40};
    //Initializing sums
    int a=0,b=0;
    for (int i = 0; i <= 2; i++){
        a=a+a1[i];
        b=b+b1[i];
    }
    //Call compare function
    compare(a,b);
    return 0;
}
//end main function

```
