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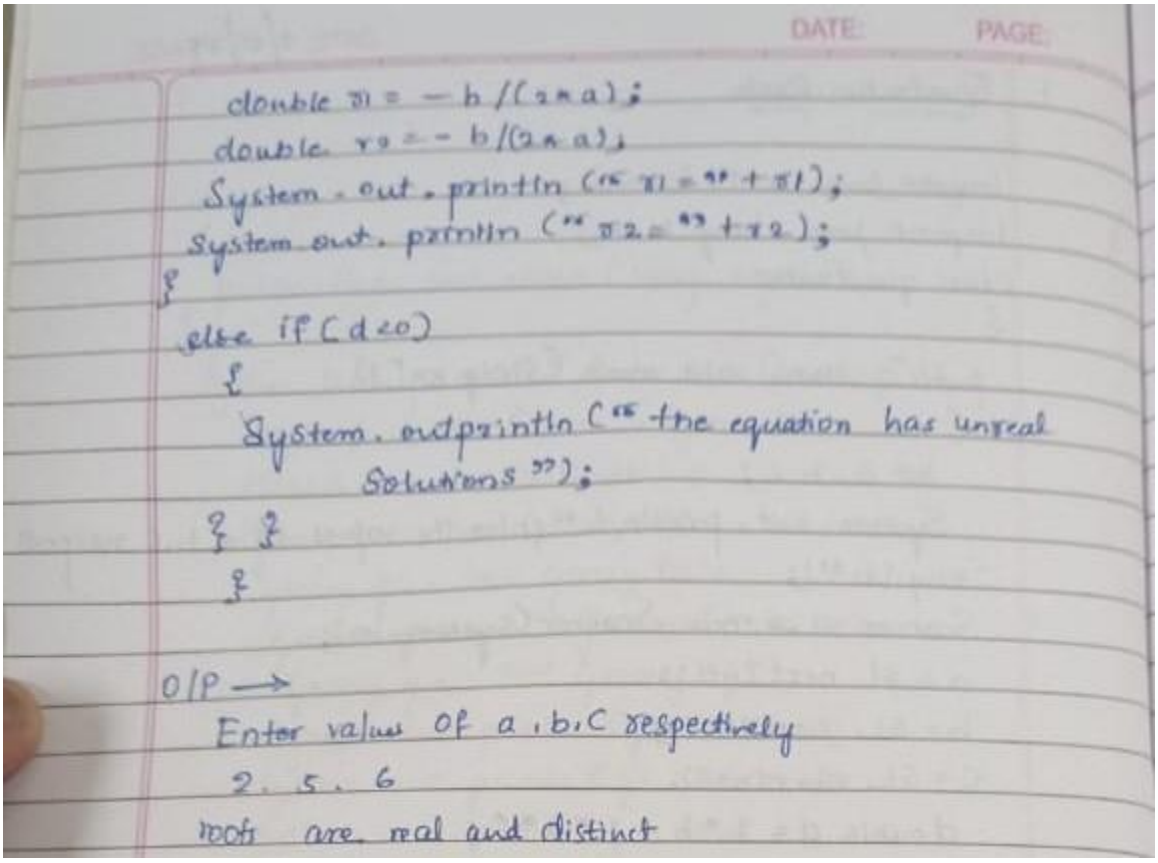
1. Quadratic Roots

```
import java.util.Scanner;
import java.lang.Math;
class quadratic
{
 public static void main (String xx[])
  {
    int a, b, c;
    System.out.println ("enter the values of a, b, c respecti
    -vely \n");
    Scanner sl = new Scanner (System.in);
    a = sl.nextInt();
    b = sl.nextInt();
    c = sl.nextInt();
    double d = b*b - 4*a*c;
    System.out.println ("a =" + a + "b=" + "c =" + c);
    if (a==0) {
      System.out.println ("not a quadratic equation"); }
    else if (d>0)
    {
    System.out.println ("the equation has two real and
        different solutions");
    double r1 = (-b + Math.sqrt (d)) / (2*a);
    double r2 = (-b + Math.Sqrt (d)) / (2*a);
    System.out.println ("r1 = " + r1);
    System.out.println ("r2 = " + r2);
}
    else if (d==0)
{
    System.out.println ("the equation has real and equal
        Solutions");
```



QUADRATIC ROOTS

```
import java.util.Scanner;
class Quad{
int a,b,c;
double d,r1,r2;
void input(){
Scanner sc=new Scanner(System.in);
System.out.println("Enter coefficients");
a=sc.nextInt();
b=sc.nextInt();
c=sc.nextInt();
}
void calc(){
```

```
double d=(b*b)-(4*a*c);
if(a==0||b==0||c==0){
System.out.println("invalid inputs");
}
else if(d>0){
System.out.println("roots are real and distinct");
r1=(-b+(Math.sqrt(d))/(2*a));
r2=(-b-(Math.sqrt(d))/(2*a));
System.out.println("r1="+r1);
System.out.println("r2="+r2);
}
else if(d==0){
System.out.println("Roots are real and equal");
r1=r2=-b/(2*a);
System.out.println("r1="+r1);
System.out.println("r2="+r2);
}
else{
System.out.println("Roots are imaginary");
r1=-b/(2*a);
r2=Math.sqrt(-d)/(2*a);
System.out.println("r1="+r1+"+i"+r2);
System.out.println("r2="+r1+"-i"+r2);
}
}
}
class QuadMain{
public static void main(String args[]){
Quad q=new Quad();
```

```
q.input();


QUADRATIC ROOTS


q.calc();
}
}
```

Output:

```
Enter coefficients
10 0 5
invalid inputs.
Enter coefficients
1 5 2
roots are real and distinct
r1=-2.9384471871911697
r2=-7.061552812808831
Enter coefficients
10 2 20
Roots are imaginary
r1=0.0+i1.4106735979665885
r2=0.0-i1.4106735979665885
Enter coefficients
1 2 1
Roots are real and equal
r1=-1.0
r2=-1.0
```