

1. $f(x) = \cos(x) - x$

```
public class Nullstellenbestimmung {  
    public static void main(String[] args) {  
        double x1 = StdInput.readDouble("Untergrenze:");  
        double x2 = StdInput.readDouble("Obergrenze:");  
        double x3;  
  
        do  
        {  
            x3 = (x1 + x2)/2;  
  
            if ((Math.cos(x1) - x1) * (Math.cos(x3) - x3) < 0)  
            {  
                x2 = x3;  
            }  
            else  
            {  
                x1 = x3;  
            }  
        }  
        while (x2 - x1 > 0.000000000000001);  
  
        System.out.println(x1);  
    }  
}
```

Lösung: Nullstelle: $x_1 = 0.739085$

2. $f(x) = e^{-x} - 0.5x + 1$

```
public class Nullstellenbestimmung {  
    public static void main(String[] args) {  
        double x1 = StdInput.readDouble("Untergrenze:");  
        double x2 = StdInput.readDouble("Obergrenze:");  
        double x3;  
  
        do  
        {  
            x3 = (x1 + x2)/2;  
  
            if ((Math.exp(-x1) - 0.5*x1 + 1) * (Math.exp(x3) - 0.5*x3 + 1) < 0)  
            {  
                x2 = x3;  
            }  
            else  
            {  
                x1 = x3;  
            }  
        }  
        while (x2 - x1 > 0.000000000000001);  
  
        System.out.println(x1);  
    }  
}
```

Lösung: Nullstelle: $x_1 = 2,21772$

3. $f(x) = x^3 - 1$

```
public class Nullstellenbestimmung {  
    public static void main(String[] args) {  
        double x1 = StdInput.readDouble("Untergrenze:");  
        double x2 = StdInput.readDouble("Obergrenze:");  
        double x3;  
  
        do  
        {  
            x3 = (x1 + x2)/2;  
  
            if((x1*x1*x1-1)*(x3*x3*x3-1)<0)  
            {  
                x2 = x3;  
            }  
            else  
            {  
                x1 = x3;  
            }  
        }  
        while(x2-x1 > 0.000000000000001);  
  
        System.out.println(x1);  
    }  
}
```

Lösung: $x_1 = 1,259921$