Question: Write a program that prompts the user to enter a point \((x, y)\) and checks whether the point is within the circle centered at \((0,0)\) with a radius 10.

Analysis:
- A circle is the set of points that are equal distant from a given point (called the center).
- Any point less than that distance (the radius) from the center is within the circle.
- The equation for the distance between two points is:

\[
d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}
\]
When is the Distance Between \((x_1,y_1)=(0,0)\) and \((x_2,y_2)\) Less Than 10?

\[
d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}
\]

\[
d^2 = (x_2-x_1)^2 + (y_2-y_1)^2
\]

\[
10^2 = (x_2-0)^2 + (y_2-0)^2
100 = x_2^2 + y_2^2
\]

Textbook: 3.23

**Question:** Write a program that prompts the user to enter a point \((x, y)\) and checks whether the point is within the [axis aligned] rectangle centered at \((0,0)\) with width 10 and height 5.

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axis aligned

Not Axis Aligned
Question: Write a program that prompts the user to enter a point \((x, y)\) and checks whether the point is within the **axis aligned** rectangle centered at \((2, 3)\) with width 10 and height 5.

The x-coordinate of the left most edge of the rectangle equals:

\[
\text{rectCenterX} - \text{rectWidth}/2
\]

\[
\text{rectCenterX} + \text{rectWidth}/2
\]

```java
double circleRadius = 10;
double circleRadius2 = circleRadius*circleRadius;

//Get input point.
Scanner input = new Scanner(System.in);
System.out.print("Enter two integers: ");
double x = input.nextDouble();
double y = input.nextDouble();

//Check if outside circle.
if (x*x + y*y > circleRadius2)
{
    System.out.println("The point ("+x + ", " + y + ") is outside the circle");
}
else
{
    System.out.println("The point ("+x + ", " + y + ") is on or inside the circle");
}
```

Note: This crashes on bad input. OK for lab 3.
/Get input point.....
//Check if outside circle......

//Check if outside rectangle
if (x < -5 || x > 5)
{
    System.out.println("The point ("+x + ", " + y + ") is outside the rectangle");
}
else if (y < -2.5 || y > 2.5)
{
    System.out.println("The point ("+x + ", " + y + ") is outside the rectangle");
}
else
{
    System.out.println("The point ("+x + ", " + y + ") is on or inside the rectangle");
}