LENGTH OF INTERCEPT ON THE CO-ORDINATE AXE'S

Consider a circle. $x^2 + y^2 + 2gx + 2fy + c = 0$

If it intersects the x-axis, the points of intersection can be found by substituting $y = 0$.

$$x^2 + 2gx + c = 0$$

Let the roots be x_1, x_2

$$x_1 + x_2 = -2g$$
$$x_1 x_2 = c$$

Length of the segment intercepted on the x-axis $2\sqrt{g^2 - c}$

1. When, $g^2 > c$ the circle intersects the x-axis at two distinct points.
2. When, $g^2 = c$ the circle touches the x-axis at one point. The roots of the quadratic equation X obtained above are equal, and the root is the point of contact.
3. When, $g^2 < c$ there is no intersection or contact with the x-axis.

Similarly, by substituting $x = 0$, we can obtain the length of the intercept on the y-axis.

Length of the segment intercepted on the y-axis $= 2\sqrt{f^2 - c}$

1. If $f^2 > c$ the circle intersects the y-axis at two distinct points.
2. If $f^2 = c$ the circle touches the y-axis.
3. If $f^2 < c$ there is no intersection or contact with the y-axis.