Tips and Tricks to solve questions quickly:

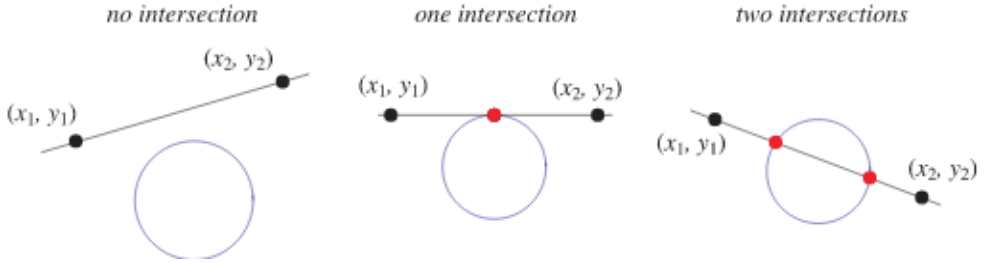
Trick-1

Intersection of a line and circle

To get point of intersection of two curves(in 2D), first get value of one coordinate from one curve, and then replace it in second curve. This way we get an equation in one variable. Just solve this to get point(s) of intersection.

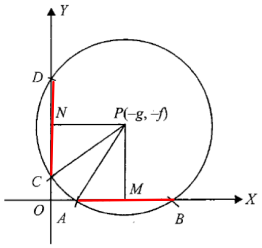
In case of circle that equation is a quadratic one. Analyse roots ot it to know points. There are three ways a line and a circle can be associated,

1. the line cuts the circle at two distinct points
2. the line is a tangent to the circle
3. the line misses the circle.



Trick-2

Intercept made by Circle on Axes



$$AB = 2AM = 2\sqrt{f^2 - c}$$

$$CD = 2CN = 2\sqrt{g^2 - c}$$

IMPORTANT FORMULAS

Illustration 3: Find the equation of the circle whose diameter is the line joining the points (-4, 3) and (12, -1). Find also the length of intercept made by it on the y-axis.

Solution:

The required equation of the circle is

$$(x + 4)(x - 12) + (y - 3)(y + 1) = 0.$$

On the y-axis, $x = 0 \Rightarrow -48 + y^2 - 2y - 3 = 0 \Rightarrow y^2 - 2y - 51 = 0 \Rightarrow y = 1 \pm \sqrt{52}$

Hence the length of intercept on the y-axis $= 2\sqrt{52} = 4\sqrt{13}.$