



# Circles

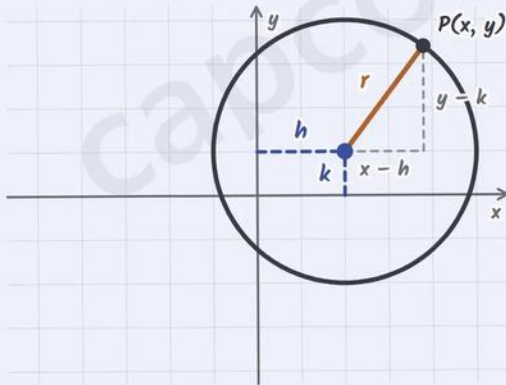


a centre, a radius, and what a line can do to them

## Standard equation

- a circle: all points of a plane at a fixed distance  $r$  from a fixed point
- the fixed point is the centre, the distance the radius
- centre  $(h,k)$  and radius  $r$  fix the circle
- centre at the origin:  $x^2+y^2=r^2$

$$(x-h)^2 + (y-k)^2 = r^2$$



$x-h$  and  $y-k$  are the run and rise to  $P$

## Standard forms \*

centre  $(h,k)$ , radius  $r$

$$(x-h)^2 + (y-k)^2 = r^2$$

centre the origin

$$x^2 + y^2 = r^2$$

ends of a diameter  $(x_1, y_1), (x_2, y_2)$

$$(x-x_1)(x-x_2) + (y-y_1)(y-y_2) = 0$$

## Special positions

**Touches the X-axis**

radius equals  $|k|$

**Touches the Y-axis**

radius equals  $|h|$

**Touches both axes**

$$|h| = |k| = r$$

**Passes through the origin**

$$h^2 + k^2 = r^2$$

