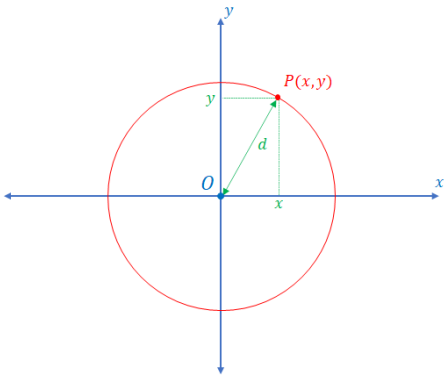
2.4 Equation for a Circle

A Equation for a Circle



- ✓ The equation for a circle with the centre in $O(0,0)$ and the radius R is given by:

  $x^2 + y^2 = R^2$

Ex 1. Prove the equation for a circle.

Ex 2. Write the equation for a circle with the centre in $(0,0)$ and the radius length equal to 5.

Ex 3. Find the radius of the circle with the equation: $x^2 + y^2 = 144$.

Ex 4. The endpoint of a diameter of a circle are $A(5,7)$ and $B(-5,-7)$. (Desmos)

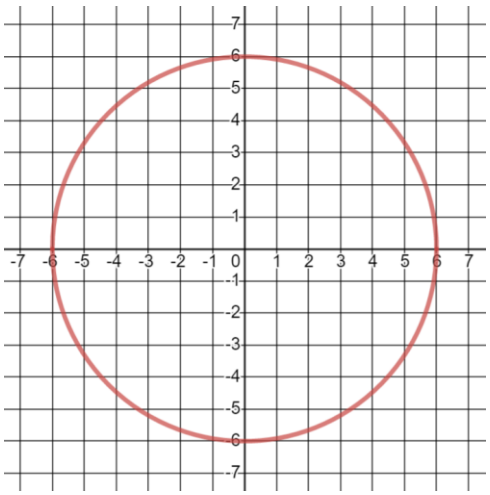
a) Prove that the centre of the circle has the coordinates $(0,0)$

b) Find the radius of the circle

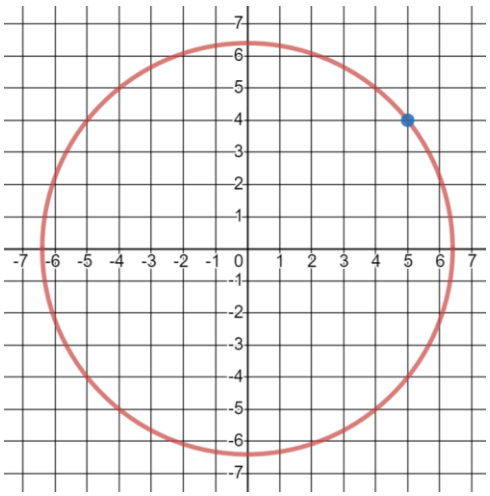
c) Write the equation of the circle

Ex 5. Find the equation of a circle with the centre $(0,0)$ that passes through the point $(4,-5)$.

Ex 6. Find the equation for each circle:



a)



b)

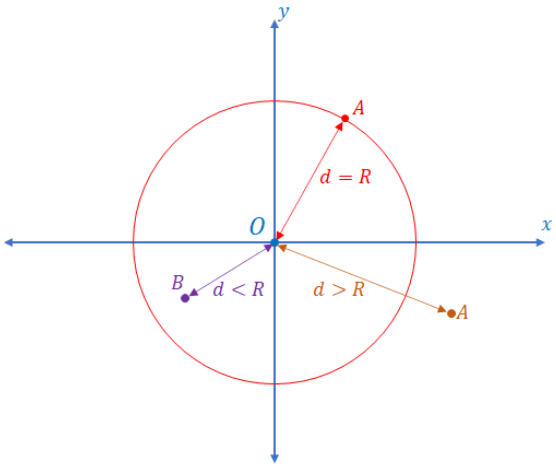
B Position of a Point relative to a Circle

Consider a circle with the centre $(0,0)$ and radius R and a point P situated at distance d from the centre. Then:

a) if $d < R$ then the point is in inside of the circle

b) if $d = R$ then the point lies on the circle

c) if $d > R$ then the point is outside of the circle



Ex 7. Find the position of each point relative to the circle given by $x^2 + y^2 = 25$. (Desmos)

a) $P(-3,4)$

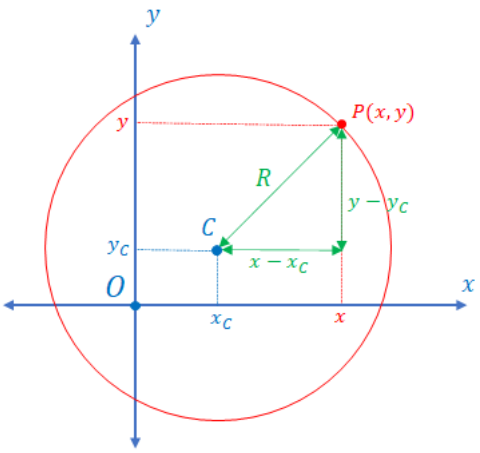
b) $Q(-3,-3)$

c) $R(3,-5)$

C Equation for a Circle (Part 2)

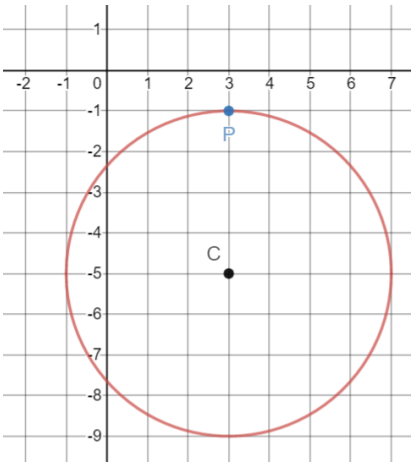
- ✓ The equation for a circle with the centre in $C(x_C, y_C)$ and the radius R is given by:

$$(x - x_C)^2 + (y - y_C)^2 = R^2$$



Ex 8. Write the equation for a circle with the centre in $C(3,-5)$ and the radius length equal to 6.

Ex 9. Find the equation of the circle given on the grid below.



Reading: Textbook Pages 92-96
Homework: Textbook Pages 96-99 # 1b, 2a, 3a, 4a, 6, 7, 18, 22,

Ex 10. Show that the following two circles are tangent (intersecting at a single point) to each other. (Desmos)

$x^2 + y^2 = 100$
$(x - 9)^2 + (y - 12)^2 = 25$

Ex 11. What is the shortest distance from the point $P(3,4)$ to the circle $x^2 + y^2 = 49$. (Desmos)

Ex 12. Show that the following relation represent a circle. Find the radius of this circle and the coordinated of the center. (Desmos)

$x^2 + y^2 + 8x - 4y + 11 = 0$