

Lesson 3

Read Chapter 3

Circles

Useful facts about circles

1. Equation of a circle (in standard form):

$$(x - x_0)^2 + (y - y_0)^2 = r^2$$

The circle has center (x_0, y_0) and radius r .

2. If a line L is tangent to a circle at P , then the line is perpendicular to the radius CP .

Find the equation of the circle centered at $(0,-5)$ with radius 3.
Does P $(-1,6)$ belong to this circle ?

For which value of x is $P(x, 6)$ on the circle centered at $(0, 5)$ with radius 3?

For which value of x is $P(x, 10)$ on the circle centered at $(0, 5)$ with radius 3?

Find the center and radius of the circle

$$x^2 + 6x + y^2 - 2y + 9 = 0$$

Intersection of a line and a circle

Find the intersection of the unit circle and the line $y = x + \frac{1}{2}$

Tangent to a circle

Find the tangent to to the circle $(x - 3)^2 + (y + 2)^2 = 5$ at the point $P(1, -1)$

Find the tangent to to the circle $(x - 3)^2 + (y + 2)^2 = 5$
through the point $Q(0, 8)$

Find the equation of the line tangent to the circle
 $(x - 3)^2 + (y + 2)^2 = 5$ and parallel to the line
 $4x - 2y + 10 = 0$

Given a circle $(x - x_0)^2 + (y - y_0)^2 = r^2$ and a point $P(x_1, y_1)$

P is on the circle if $(x_1 - x_0)^2 + (y_1 - y_0)^2 = r^2$

P is inside the circle if $(x_1 - x_0)^2 + (y_1 - y_0)^2 < r^2$

P is outside the circle if $(x_1 - x_0)^2 + (y_1 - y_0)^2 > r^2$