EngineeringRise

Circle

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Standard form	(x - h)^2 + (y - k)^2 = r^2 Valid when: circle with centre (h, k) and radius r > 0	length squared
General form	x^2 + y^2 + 2gx + 2fy + c = 0 Valid when: x^2 and y^2 coefficients both 1, no xy term	length squared
Centre and radius (general form)	(-g, -f); r = sqrt(g^2 + f^2 - c) Valid when: real circle only if g^2 + f^2 - c > 0	length
Diameter form	(x - x1)(x - x2) + (y - y1)(y - y2) = 0 Valid when: (x1, y1) and (x2, y2) are ends of a diameter	length squared
Chord cut by a line	2 sqrt(r^2 - d^2) Valid when: d is the centre-to-line distance, d < r	length
Tangency of y = m x + c to x^2 + y^2 = r^2	c^2 = r^2 (1 + m^2) Valid when: non-vertical line y = mx + c; circle centred at origin	length squared
Tangent at (x1, y1) to x^2 + y^2 = r^2	x x1 + y y1 = r^2 Valid when: (x1, y1) lies on the circle centred at the origin	length squared
Length of tangent from P	sqrt(S1) = sqrt(PO^2 - r^2) Valid when: P outside the circle; S1 is the circle's expression at P	length
Common chord of S1 = 0 and S2 = 0	S1 - S2 = 0 Valid when: both circles have x^2, y^2 coefficients equal to 1; they intersect	length squared
Intercepts on the axes	x-axis: 2 sqrt(g^2 - c); y-axis: 2 sqrt(f^2 - c) Valid when: general-form circle; real intercepts need g^2 > c, f^2 > c	length

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/mathematics/coordinate-geometry/circle

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