EngineeringRise

Area under curves

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

Result	Formula	Units or note
Area under a curve	A = integral from a to b of |f(x)| dx Valid when: f continuous on [a, b]; |f| splits the area where f changes sign	square units (units of x times units of y)
Area between curves (dx)	A = integral from a to b of [f(x) - g(x)] dx, f above g Valid when: f and g continuous, f(x) >= g(x) on [a, b]	square units
Area between curves (dy)	A = integral from c to d of [x_right - x_left] dy Valid when: x_right(y) >= x_left(y) on [c, d], both continuous	square units
Circle	x^2 + y^2 = r^2 has area pi r^2 Valid when: circle centred at origin, radius r	square units (length squared)
Ellipse	x^2/a^2 + y^2/b^2 = 1 has area pi a b Valid when: ellipse centred at origin with semi-axes a and b	square units (length squared)
Two parabolas	y^2 = 4ax and x^2 = 4by enclose 16 a b / 3 Valid when: a > 0 and b > 0; region between the two curves	square units (length squared)
Symmetry	region symmetric about an axis: A = 2 x (half) ; about both axes: 4 x (quadrant) Valid when: region symmetric about the axis (or both axes) used for the multiplier	dimensionless multiplier

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/mathematics/integral-calculus/area-under-curves

EngineeringRise is an unofficial study site. It is not affiliated with NTA, the IITs, BITS, VIT, SRM or any exam body.