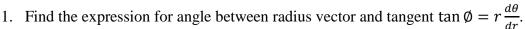


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Question bank - BMATS101 (AI/CS/IS/IOT)



- Determine the angle between the curves $r = a(1 + cos\theta)$ and $r = b(1 cos\theta)$.
- Find the angle between the radius vector and the tangent of the curve $\frac{2a}{r} = 1 + \cos \theta$.
- Determine the angle of intersection between the curves $r = alog\theta$ and $r = \frac{a}{log\theta}$.
- 5. Find the pedal equation of the curve $r^{m} = a^{m} \cos m\theta + b^{m} \sin m\theta$.
- Determine the radius of curvature for the curves $x = a\cos^3\theta$ and $y = b\sin^3\theta$ at $\theta = \frac{\pi}{4}$.
- Show that for the equiangular spiral $r = ae^{\theta cot\alpha}$, $\frac{\rho}{r}$ is constant.
- 8. Derive the formula for radius of curvature of the curve in Cartesian form $\rho = \frac{(1+y_1^2)^{3/2}}{v_2}$.
- 9. Find the radius of curvature of the curve $x^3 + y^3 = 3axy$ at $\left(\frac{3a}{2}, \frac{3a}{2}\right)$.
- 10. Find the radius of curvature of the curve x = a(cost + tsint) and y = a(sint tcost).
- 11. Show that the radius of curvature for the curve $r^n = a^n \cos n\theta$ varies inversely as r^{n-1} .
- 12. Derive the formula for radius of curvature of the curve in polar form as $\rho = \frac{(r^2 + r_1^2)^{3/2}}{r^2 + 2r^2 rr}$.
- 13. Expand $\log (1+e^x)$ in Maclurin's series upto third degree term.
- 14. Determine the Maclaurin's series expansion of log(sec x + tanx) up to the terms containing fourth degree.
- 15. Express $\log(1+x)$ as Maclaurin's series up to fifth degree terms and hence prove that

$$\log \sqrt{\frac{1+x}{1-x}} = x + \frac{x^3}{3} + \frac{x^5}{5} + \dots$$

$$\lim_{x \to a} \left(2 - \frac{x}{a} \right)^{\tan\left(\frac{\pi x}{2a}\right)}$$
 of the indeterminate form

- 16. Find the value of the indeterminate form
- 17. Find the value of the given indeterminate form $\lim_{x\to 0} (\cos x)^{\frac{1}{x^2}}$.
- 18. Find the value of the given indeterminate form, $\lim_{x\to 0} \left(\frac{a^x + b^x + c^x}{2}\right)^{\frac{1}{x}}$.
- 19. Find the value of the indeterminate form $\lim_{x\to 0} (a^x + x)^{\frac{1}{x}}$.

- 20. Determine the radius of curvature of $r(1-\cos\theta)=2a$ hence show that ρ^2 varies as r^3 .
- 21. Determine the radius of curvature of the curve $r = a(1 + \cos \theta)$, S.T $\frac{\rho^2}{r} = constant$.