

Coimbatore-641035.

D9fferential Calculus

Unit 3-Differential Calculus

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Curvature

1. $\frac{d}{dx}(c) = 0$, c is a $15. \frac{d}{dx} \cos^{-1}x = \frac{-1}{\sqrt{1-\chi^2}}$ 2. $\frac{d}{dx} x^n = nx^{n-1}$ 3. $d e^{\chi} = e^{\chi}$ 16. $\frac{d}{dx} \pm an^{-1}\chi = \frac{1}{1+\chi^2}$ 17. $d e^{\chi} = e^{\chi}$ 16. $\frac{d}{dx} \pm an^{-1}\chi = \frac{1}{1+\chi^2}$ $dx = \frac{1}{dx} \qquad \qquad 17. \frac{d}{dx} \quad \omega_{\pm}^{-1} x = \frac{-1}{1+x^2}$ 3. $\frac{d}{dx}e^{x} = e^{x}$ 18. d cosec = = = -1 5. $\frac{d}{dx}$ S9 $nx = \cos x$ 6. $\frac{d}{dx}$ $\cos x = -\sin x$ 6. $\frac{d}{dx} \cos x = -\sin x$ 7. $\frac{d}{dx} \pm an x = \sec^{2} \pi$ 8. $\frac{d}{dx} \sec x = \sec^{2} \pi$ 9. $\frac{d}{dx} \sec x = -\csc^{2} \pi$ 10. $\frac{d}{dx} \cos x = -\csc^{2} \pi$ 11. $\frac{d}{dx} = -\csc^{2} \pi$ 12. $\frac{d}{dx} = -\csc^{2} \pi$ 13. $\frac{d}{dx} = -\csc^{2} \pi$ 14. $\frac{d}{dx} = -\csc^{2} \pi$ 15. $\frac{d}{dx} = -\csc^{2} \pi$ 16. $\frac{d}{dx} = -\csc^{2} \pi$ 17. $\frac{d}{dx} = -\csc^{2} \pi$ 18. $\frac{d}{dx} = -\csc^{2} \pi$ 19. $\frac{d}{dx} \sec^{-1} x = \frac{1}{x\sqrt{x^{2}}}$ 10. $\frac{d}{dx} = -\csc^{2} \pi$ 11. $\frac{d}{dx} = 1$ 12. $\frac{1}{x\sqrt{x^{2}}}$ 13. $\frac{d}{dx} = 1$ 14. $\frac{1}{x\sqrt{x^{2}}}$ 15. $\frac{d}{dx} = 1$ 16. $\frac{d}{dx} = 1$ 17. $\frac{d}{dx} = 1$ 17. $\frac{d}{dx} = 1$ 18. $\frac{d}{dx} = 1$ 19. $\frac{d}{dx} = \frac{1}{x\sqrt{x^{2}}}$ 19. $\frac{d}{dx} = \frac{1}{x\sqrt{x^{2}}}$ 19. $\frac{d}{dx} = \frac{1}{x\sqrt{x^{2}}}$ 10. $\frac{d}{dx} = 1$ 11. $\frac{d}{dx} = 1$ 12. $\frac{1}{x\sqrt{x^{2}}}$ 13. $\frac{1}{x\sqrt{x^{2}}}$ 14. $\frac{1}{x\sqrt{x^{2}}}$ 15. $\frac{1}{x\sqrt{x^{2}}}$ 16. $\frac{1}{x\sqrt{x^{2}}}$ 17. $\frac{1}{x\sqrt{x^{2}}}$ 18. $\frac{1}{x\sqrt{x^{2}}}$ 19. $\frac{1}{x\sqrt{x^{$ 20. <u>d</u> SPANZ= Cashx 21. <u>d</u> coshx=SPADX dx 11. $\frac{d}{d\alpha} \frac{1}{\alpha} = -\frac{1}{\alpha^2}$ 12. $\frac{d}{dx} \begin{bmatrix} -1 \\ x^2 \end{bmatrix} = \frac{a}{x^3}$ $a_2 \cdot \frac{d}{dx} (uv) = u dv + v du$ 13. $\frac{d}{dx}\sqrt{x} = \frac{1}{2\sqrt{x}}$ as $\frac{d}{dx}\left[\frac{u}{\sqrt{x}}\right] = \frac{\sqrt{u'-uv'}}{\sqrt{x}}$ 14. $\frac{d}{1-x}$ STD⁻¹ x = $\frac{1}{\sqrt{1-x^2}}$ anything = $\frac{1}{2m_1^2\omega_{r_1}^2} = 0$



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Curvature

Ciorvature:

The state of bendling of a wrive at any point on it is called the wrivative of the curve at that point

Radlasof Curvature:

The reciprocal of the curvature of the curve at any point is called the redius of curvature at that point. It is denoted by P.

Formula:

Let
$$y = f(x)$$
 be the given curve. Then

$$f = \frac{\left[1 + \left[\frac{dy}{dx}\right]^2\right]^{3/2}}{\frac{d^2 y}{dx^2}}$$
It $\frac{dy}{dx^2} = x^2 + 0$ point on the curve $y = f(x)$, then

 $\mathcal{P} = \frac{\left[1 + \left(\frac{dx}{dy}\right)^2\right]^{3/2}}{\frac{d^2 x}{dy^2}}$

Note:

I. The general form of eqn. of curcle is $x^{a} + y^{a} + ag \times + 2fy + c = 0$ where $(an \neq ag \times - f)$ and reading $= \sqrt{g^{a} + f^{a} - c}$

2]. The madeus of curvature at any point on the curve = madeus of the curve.

avivatione of the circle = 1 where 7 33 the realize of the circle.

3]. curvature of the straight line is 70010.

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Curvature

Current with constructions at any pt. on the current is
$$x^2 + y^2 - 6x - 4y + 10 = 0$$

Solon.
The general form is $x^2 + y^2 + 2gx + 2fy + c = 0$
Here $2g = -6 \Rightarrow 9 = -3$
 $2f = -9 \Rightarrow f = -2$
 $cntre = (-9, -f) = (3, 2)$
Radles $= \sqrt{g^2 + f^2 - c} = \sqrt{9 + 4 - 10} = \sqrt{13}$
 $f = 7 = \sqrt{3}$
Current with $e = \frac{1}{f} = \frac{1}{\sqrt{3}}$
All, find the current where $G = 2x^2 + 2y^2 + 5x - 2y + 1 = 0$
Solon.
The general form is $x^2 + y^2 + 2gx + 2fy + c = 0$
 $x^2 + y^2 + \frac{5}{2}x - y + \frac{1}{2} = 0$
Here $2g = \frac{5}{2} \Rightarrow g = \frac{5}{4}$
 $2f = -1 \Rightarrow f = -\frac{1}{2}$
 $centre = (-9, -f) = (-5/4 + \frac{1}{2})$
Radles $= \sqrt{g^2 + f^2 - c} = \sqrt{\frac{25}{16}} + \frac{1}{4} - \frac{1}{2} = \sqrt{\frac{21}{16}}$
 $f^2 = x = \sqrt{\frac{5}{16}}$
 $current with $e = \frac{1}{f^2} = \frac{4}{\sqrt{21}}$
all. Find the current with $g = x^2 + y^2 + 2gx + 2fy = 5$
Solon.
The general form is $x^3 + y^2 + 2gx + 2fy = 5$$

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Here
$$ag = 0 \Rightarrow g = 0$$

 $af = 0 \Rightarrow f = 0$
 $(an \pm ne = (0, 0)$
Radlus $f = \sqrt{5}$
 $cunva \pm une = \frac{1}{f} = \frac{1}{\sqrt{5}}$
Hw find the univature of
 $1, x^{a} + y^{a} + 4x - 6y - 1 = 0$
 $a), 3x^{a} + 3y^{2} + 9x + 18y - 5 = 0$
 $a), ax^{a} + ay^{a} = a$

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Curvature