Ultimate KCET Crash Course 2026

maths

Methods of Differentiation

DPP: 3

Q1 Derivative of $\log_{10}x$ with respect to x^2 is

(A) $2x^2 \log_e 10$ (B) $\frac{\log_{10} e}{2x^2}$

(C) $\frac{\log_e 10}{2x^2}$ (D) $x^2 \log_e 10$

Q2 If $x = \sin^{-1}(3t - 4t^3)$ and $y = \cos^{-1}(1 - 2t^2)$ then dy/dx is equal to

(A) −2/3 (B) −3/2

(C) 2/3 (D) 3/2

Q3 If $u = \log_3 x$ and $v = \log_x 6$. Find $\frac{du}{dv}$

(A) $\frac{1}{x^2}$ (B) $\frac{1}{x \log 6}$

(C) $\frac{-(\log x)^2}{\log 3 \log 6}$ (D) x log 3

Q4 If x = $\log_3$cos , y = $\log_9 \sin$ then $\frac{dy}{dx}$, when $\theta = \frac{\pi}{4}$ is

(A) 1/2 (B) 1

(C) -1 (D) -1/2

Q5 Find $\frac{dy}{dx}$ when $x = \cos^{-1} \frac{1}{\sqrt{1+t^2}}$, $y = \sin^{-1} \frac{t}{\sqrt{1+t^2}}$

(A) -1 (B) 1

(C) 0 (D) 1/2

Q6 If $\tan y = \frac{2t}{1-t^2}$ and $\sin x = \frac{2t}{1+t^2}$, then $\frac{dy}{dx} =$

(A) $\frac{2}{1+t^2}$ (B) $\frac{1}{1+t^2}$

(C) 1 (D) 2

Q7 If $y = \frac{1}{4}u^4$, $u = \frac{2}{3}x^3 + 5$, then $\frac{dy}{dx} =$

(A) $\frac{1}{27}x^2\left(2x^3 + 15\right)^3$ (B) $\frac{1}{27}x\left(2x^3 + 5\right)^3$

(C) $\frac{2}{27}x^2\left(2x^3 + 15\right)^3$ (D) None of these

Q8 If $u = e^{\sin^{-1}(1-2t^2)}$ and $v = e^{\cos^{-1}(1-2t^2)}$. Find $\frac{dv}{du}$

(A) -v/u (B) -u/v

(C) u/v (D) v/u

Q9 If $u = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ and $v = \sin^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)$. Find $\frac{du}{dv}$

(A) 1 (B) 0

(C) 2 (D) 1/2

Q10 If $x = \tan t$, $y = \cos t$, $0 < t < \frac{\pi}{2}$ then $\frac{dy}{dx} =$

(A) xy^2 (B) $-x^2y$

(C) xy (D) $-xy^3$

Q11 If $x = a\left(\cos t + \log\tan \frac{t}{2}\right)$, $y = a \sin t$, then $\frac{dy}{dx} =$

(A) tan t (B) −tan t

(C) cot t (D) −cot t

Q12 If x = 2 cos t − cos 2t, y = 2 sin t − sin 2t, then at $t = \frac{\pi}{4}$, $\frac{dy}{dx} =$

(A) $\sqrt{2} + 1$ (B) $\sqrt{2} - 1$

(C) $\frac{\sqrt{2}+1}{2}$ (D) None of these

Q13 If $x = \frac{1-t^2}{1+t^2}$ and $y = \frac{2t}{1+t^2}$, then $\frac{dy}{dx}$ is equal to

(A) −y/x (B) y/x

(C) −x/y (D) x/y

Q14 If $x = a\cos^3 t$, $y = a\sin^3 t$ then $\frac{dy}{dx}$ at $t = \frac{\pi}{3}$ is

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$

(C) $-\sqrt{3}$ (D) $\frac{-1}{\sqrt{3}}$

Q15 If $x = \cos^3\theta$, $y = \sin^3\theta$ then $\sqrt{1+\left(\frac{dy}{dx}\right)^2} =$

(A) $\tan^2\theta$ (B) $\sec^2\theta$

(C) $\sec\theta$ (D) $|\sec\theta|$

Q16 If $x = a\sin t - b\cos t$, $y = a\cos t + b\sin t$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{x^2+y^2}{y^3}$ (B) $\frac{y^3}{x^2+y^2}$

(C) $\frac{-y^3}{x^2+y^2}$ (D) $-\frac{x^2+y^2}{y^3}$

Q17 If $x = \frac{3at}{1+t^3}$, $y = \frac{3at^2}{1+t^3}$, then $\frac{dy}{dx} =$

(A) $\frac{t(2+t^3)}{1-2t^3}$

(B) $\frac{t(2-t^3)}{1-2t^3}$

(C) $\frac{t(2+t^3)}{1+2t^3}$

(D) $\frac{t(2-t^3)}{1+2t^3}$

Q18 Find, $\frac{dy}{dx}$, when x = sin t, y = cos 2t.

(A) 4 sin t (B) $\frac{4}{\sin t}$

(C) –4 sin t (D) $\frac{\sin t}{4}$

Q19 If x = a(3 cos θ+cos 3θ), y = a(3sinθ+sin3θ), then dy/dx is

(A) cot θ (B) tan θ

(C) cot 2θ (D) -cot 2θ

Q20 If $x = \frac{1-t}{1+t}$; $y = \frac{2t}{1+t}$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{2t}{(1+t)^2}$ (B) $\frac{1}{(1+t)^4}$

(C) $\frac{2t^2}{(1+t)^2}$ (D) 0

Q21 If x = a $\cos^2 2t$ and y = b $\sin^2 2t$, then $\frac{dy}{dx}$ at $t = \frac{18\pi}{7}$ is

(A) a/b (B) -b/a

(C) b/a (D) None of these

Q22 If $x = \sin^{-1}(3t - 4t^3)$ and $y = \cos^{-1}\left(\sqrt{1-t^2}\right)$, then $\frac{dy}{dx}$ is equal to

(A) 1/2 (B) 2/3

(C) 1/3 (D) 2/5

Q23 If x = a $\cos^4$t and y = b $\sin^4$t, then $\frac{dy}{dx}$ at $t = \frac{3\pi}{4}$ is

(A) -b/a (B) b/a

(C) a/b (D) -a/b

Q24 The derivative of sin (x^3) w.r.t. cos (x^3) is

(A) –cot (x^3)

(B) cot (x^3)

(C) –tan (x^3)

(D) tan (x^3)

Q25 If $x = \sqrt{a^{\sin^{-1}t}}$ and $y = \sqrt{a^{\cos^{-1}t}}$, then $\frac{dy}{dx} =$

(A) $-\frac{y}{x}$ (B) $\frac{y}{x}$

(C) $\frac{-x}{y}$ (D) $\frac{x}{y}$

Q26 The differential coefficient of $\log_{10}x$ with respect to $\log_x 10$ is

(A) 1

(B) $-(\log_{10}x)^2$

(C) $(\log_x 10)^2$

(D) $\frac{x^2}{100}$

Q27 Derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ w.r.t. $\sqrt{1+3x}$ at $x = -\frac{1}{3}$ is

(A) 0 (B) 1/2

(C) 1/3 (D) None of these

Q28 Derivative of $\sin^{-1}\left(2x\sqrt{1-x^2}\right)$ with respect to $\tan^{-1}\frac{x}{\sqrt{1-x^2}}$ is equal to

(A) 1 (B) –1

(C) –2 (D) 2

Q29 If $x = a \sin t - b \cos t$, $y = a \cos t + b \sin t$, then $\frac{d^2y}{dx^2} =$

(A) $\frac{x^2+y^2}{y^3}$

(B) $\frac{y^3}{x^2+y^2}$

(C) $\frac{-y^3}{x^2+y^2}$

(D) $-\frac{x^2+y^2}{y^3}$

Q30 The derivative of sin x with respect to log x is

(A) $\frac{\cos x}{x}$

(B) cos x

(C) x cos x

(D) $\frac{\cos x}{\log x}$

Answer Key

Q1	B
Q2	C
Q3	C
Q4	D
Q5	B
Q6	C
Q7	C
Q8	A
Q9	C
Q10	D
Q11	A
Q12	A
Q13	C
Q14	C
Q15	D
Q16	D
Q17	B
Q18	C
Q19	D
Q20	D
Q21	B
Q22	C
Q23	A
Q24	A
Q25	A
Q26	B
Q27	D
Q28	D
Q29	D
Q30	C

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Let $y = \log_{10} x$ and $z = x^2$

Taking derivative w.r.t. x, we get

$$\frac{dy}{dx} = \frac{1}{x \log_e 10} \quad ...(i) \qquad \frac{dz}{dx} = 2x \quad ...(ii)$$

$$\therefore \frac{dy}{dz} = \frac{\frac{dy}{dx}}{\frac{dz}{dx}} = \frac{1}{x \times 2x \log_e 10} = \frac{\log_{10} e}{2x^2}$$

Video Solution:

Q2 Text Solution:

$$x = 3\sin^{-1} t$$

$$\frac{x}{3} = \sin^{-1} t$$

$$y = 2\sin^{-1} t$$

$$\frac{y}{2} = \sin^{-1} t$$

$$\Rightarrow \frac{x}{3} = \frac{y}{2}$$

$$y = \frac{2}{3}x$$

$$\frac{dy}{dx} = \frac{2}{3}$$

Video Solution:

Q3 Text Solution:

$$u = \log_3 x \text{ and } v = \frac{\log 6}{\log x}$$

$$u = \frac{\log x}{\log 3} \quad \frac{dv}{dx} = \frac{\log 6}{\frac{1}{x}}$$

$$\frac{du}{dx} = \frac{1}{\log 3} \times \frac{-x}{(\log x)^2}$$

$$\Rightarrow \frac{du}{dv} = \frac{du/dx}{dv/dx} = \frac{\frac{1}{x \log 3}}{\frac{-x}{\log 3(\log x)^2}} = \frac{-(\log x)^2}{\log 3 \log 6}$$

Video Solution:

Q4 Text Solution:

$$\frac{dx}{d\theta} = \frac{1}{\log 3} \times \frac{1}{\cos\theta} \times -\sin\theta.$$

$$= \frac{-\tan\theta}{\log 3}$$

$$\frac{dy}{d\theta} = \frac{1}{\log 9} \times \frac{1}{\sin\theta} \times \cos\theta$$

$$= \frac{\cot\theta}{\log 9}$$

$$\frac{dy}{dx} = \frac{\cot\theta}{\log 9} \times \frac{\log 3}{-\tan\theta.}$$

$$= \frac{1}{-2\tan 2\theta}$$

$$\left.\frac{dy}{dx}\right]_{\theta=\frac{\pi}{4}} = \frac{1}{-2\times 1} = -\frac{1}{2}.$$

Video Solution:

Q5 Text Solution:

put $t = \tan\theta$.

$$x = \cos^{-1}\left(\frac{1}{\sqrt{\sec^2\theta}}\right)$$

$$x = \cos^{-1}(\cos\theta)$$

$$x = \theta$$

$$x = \tan^{-1} t$$

$$\frac{dx}{dt} = \frac{1}{1+t^2}$$

$$y = \sin^{-1}\left(\frac{\tan\theta}{\sqrt{1+\tan^2\theta}}\right) \quad \left|\frac{dy}{dx} = 1\right.$$

$$y = \sin^{-1}(\sin\theta)$$

$$y = \theta = \tan^{-1} t$$

$$\frac{dy}{dt} = \frac{1}{1+t^2}$$

Video Solution:

Q6 Text Solution:

$$y = \tan^{-1}\left(\frac{2t}{1-t^2}\right) \text{ and } x = \sin^{-1}\left(\frac{2t}{1+t^2}\right)$$

take the subsitution, t = tan q

$$\Rightarrow \; y = 2\theta \quad \text{and} \quad x = 2\theta$$

$$\frac{dy}{d\theta} = 2 \;\text{ and }\; \frac{dx}{d\theta} = 2$$

$$\therefore \frac{dy}{dx} = 1$$

Video Solution:

Q7 Text Solution:

$$y = \frac{1}{4}u^4, \quad u = \frac{2}{3}x^3 + 5$$

Differentiate both 'y' and 'u' wrt 'x'

$$\frac{dy}{dx} = u^3\frac{du}{dx} \quad \text{and} \quad \frac{du}{dx} = 2x^2$$

$$\therefore \frac{dy}{dx} = \left(\frac{2}{3}x^3 + 5\right)2x^2 = \frac{2}{27}x^2\left(2x^3 + 15\right)^3$$

Video Solution:

Q8 Text Solution:

$$uv = e^{\sin^{-1}(1-2t^2)} \times e^{\cos^{-1}(1-2t^2)}$$

$$= e^{\sin^{-1}(1-2t^2) + \cos^{-1}(1-2t^2)}$$

$$uv = e^{\pi/2}$$

diff. w.r.t. u

$$u\frac{dv}{du} + v = 0$$

$$u\frac{dv}{du} = -v$$

$$\frac{dv}{du} = -\frac{v}{u}$$

Video Solution:

Q9 Text Solution:

$u=\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$

put $x=\tan\theta$.

$u=\cos^{-1}\left(\frac{1-\tan^2\theta}{1+\tan^2\theta}\right)$

$u=\cos^{-1}(\cos 2\theta)$

$u=2\theta.$

$v=\sin^{-1}\left(\frac{\tan\theta}{\sec\theta}\right)$

$=\sin^{-1}(\sin\theta)$

$v=\theta$

$\Rightarrow u=2v.$

$\frac{du}{dv}=2$

Video Solution:

Q10 Text Solution:

Since 't' is the parameter,
Differentiating 'x' & 'y' parametrically

$\frac{dx}{dt}=\sec^2 t\ \&\ \frac{dy}{dt}=-\sin t$

$\Rightarrow \frac{dy}{dx}=\frac{-\sin t}{\sec^2 t}=-\tan t.\cos^3 t=-xy^3$

Video Solution:

Q11 Text Solution:

Given that
$x=a\left(\cos t+\log\tan\frac{t}{2}\right)$ and $y=a\sin t$

Differentiating with respect to t, we get

$\frac{dy}{dt}=a\cos t$ ....(i)

and $\frac{dx}{dt}=a\left[-\sin t+\cot\left(\frac{t}{2}\right)\times\left(\frac{1}{2}\right)\sec^2\left(\frac{t}{2}\right)\right]$

$=a\left(-\sin t+\frac{1}{\sin t}\right)=a\frac{\cos^2 t}{\sin t}$

$=a(\cos t)\ (\cot\ t)$ ...(ii)

From (ii) and (i), we get $\frac{dy}{dx}=\tan t.$

Video Solution:

Q12 Text Solution:

x = 2 cos t – cos 2t and y = sin t – sin 2t

$\frac{dx}{dt}=-2\sin t+2\sin 2t$ and

$\frac{dy}{dt}=2\cos t-2\cos 2t$

then $\left.\frac{dy}{dx}\right|_{t=\pi/4}=\sqrt{2}+1$

Video Solution:

Q13 Text Solution:

$x=\frac{1-t^2}{1+t^2} \quad y=\frac{2t}{1+t^2}$

Put $t=\tan\theta$

$x=\cos\ 2\theta \qquad y=\sin\ 2\theta$

$\frac{dx}{d\theta}=-2\sin\ 2\theta$ and $\frac{dy}{d\theta}=2\cos\ 2\theta$

$\frac{dy}{dx}=-\frac{x}{y}$

Video Solution:

Q14 Text Solution:

Since 't' is the parameter,

Differentiating 'x' & 'y' parametrically

$\frac{\mathrm{dx}}{\mathrm{dt}}=-3a\cos^2 t.\sin t$ & $\frac{\mathrm{dy}}{\mathrm{dt}}=3a\sin^2 t$ $.\cos t$

$\Rightarrow \frac{\mathrm{dy}}{\mathrm{dx}}=\frac{-3a\cos^2 t.\sin t}{3\ \mathrm{asin}^2\ \mathrm{t.cost}}=-\tan t$

$at\ x=\frac{\pi}{3}$

$\frac{dy}{dx}=-\sqrt{3}$

Video Solution:

Q15 Text Solution:

$\frac{dx}{d\theta}=-3\cos^2\theta\sin\theta$ & $\frac{dy}{d\theta}=3\sin^2\theta\cos\theta$

$\frac{dy}{dx}=-\tan\theta$

$\Rightarrow \sqrt{1+\left(\frac{dy}{dx}\right)^2}=\left|sec\theta\right|$

Video Solution:

Q16 Text Solution:

$\frac{dx}{dt}=a\cos t+b\sin t$ and $\frac{dy}{dt}=-a\sin t+b\cos t$

$\therefore \frac{dy}{dx}=\frac{b\cos t-a\sin t}{a\cos t+b\sin t}=\frac{-x}{y}$

$\therefore \frac{d^2y}{dx^2}=-\left[\frac{y(1)-x\cdot y_1}{y^2}\right]$

$\frac{d^2y}{dx^2}=-\left[\frac{y^2+x^2}{y^3}\right]$

Video Solution:

Q17 Text Solution:

$x=\frac{3at}{1+t^3}; \quad y=\frac{3at^3}{1+t^3}$

$\frac{dx}{dt}=\frac{3a-6at^3}{(1+t^3)^2}; \quad \frac{dy}{dt}=\frac{6at-3at^4}{(1+t^3)^2}$

Now, $\frac{dy}{dx}=\frac{dy/dt}{dx/dt}=\frac{3at(2-t^3)}{3a(1-2t^3)}$

$\therefore \frac{dy}{dx}=\frac{t(2-t^3)}{1-2t^3}$

Video Solution:

Q18 Text Solution:

(C)

We have, x = sin t

$\therefore \frac{dx}{dt} = \cos t$

Also, y = cos 2 t

$\therefore \frac{dy}{dt} = -2 \sin 2t$

Now,

$\frac{dy}{dx} = \frac{-2 \sin 2t}{\cos t} = \frac{-2\times 2 \sin t \cos t}{\cos t} = -4 \sin t$

Video Solution:

Q19 Text Solution:

$x = a(3\cos\theta + \cos 3\theta) \Rightarrow \frac{dx}{d\theta}$

$= a[-3\sin\theta - \sin 3\theta.3]$

$= -3a[\sin\theta + \sin 3\theta]$

And $y = a(3\sin\theta + \sin 3\theta) \Rightarrow \frac{dy}{d\theta}$

$= 3a[\cos\theta + \cos 3\theta]$

$\therefore \frac{dy}{dx} = \frac{3a[\cos\theta + \cos 3\theta]}{-3a[\sin\theta + \sin 3\theta]} = \frac{-[\cos 3\theta + \cos\theta]}{\sin 3\theta + \sin\theta}$

$= \frac{-2\cos 2\theta\cdot\cos\theta}{2\sin 2\theta\cdot\cos\theta} = -\cot 2\theta$

Video Solution:

Q20 Text Solution:

$x = \frac{1-t}{1+t}, y = \frac{2t}{1+t}$

$\frac{dx}{dt} = \frac{(1+t)(-1)-(1-t)\cdot 1}{(1+t)^2} = \frac{-2}{(1+t)^2}$

$\frac{dy}{dt} = \frac{(1+t)2-2t\cdot 1}{(1+t)^2} = \frac{2+2t-2t}{(1+t)^2} = \frac{2}{(1+t)^2}$

$\frac{dy}{dx} = \frac{dy}{dt}\cdot\frac{dt}{dx} = \left(\frac{2}{(1+t)^2}\right)\left(\frac{(1+t)^2}{-2}\right) = -1$

$\therefore \frac{d^2y}{dx^2} = \frac{d}{dx}(-1) = 0$

Video Solution:

Q21 Text Solution:

$\frac{dy}{dx} = \frac{b\cdot 2\sin 2t\cdot\cos 2t\cdot 2}{a\cdot 2\cos 2t(-\sin 2t)\cdot 2} = \frac{-b}{a}$

$\therefore$ at $t = \frac{18\pi}{7}, \frac{dy}{dx} = \frac{-b}{a}$

Video Solution:

Q22 Text Solution:

Let t = sin θ, then $x=\sin^{-1}\left(3t-4t^3\right)$

$\Rightarrow\ x=\sin^{-1}\left(3\sin\theta-4\sin^3\theta\right)\Rightarrow x$

$=\sin^{-1}(\sin 3\theta)$

$\Rightarrow\ x=3\theta.$

$Also,\ y=\cos^{-1}\left(\sqrt{1-t^2}\right)\Rightarrow y$

$=\cos^{-1}(\cos\theta)\Rightarrow y=\theta$

$\therefore\ \frac{dy}{dx}=\frac{dy/d\theta}{dx/d\theta}=\frac{1}{3}$

Video Solution:

Q23 Text Solution:

$\frac{dy}{dx}=\frac{b\cdot 4\sin^3 t\cdot\cos t}{a\cdot 4\cos^3 t(-\sin t)}=\frac{-b}{a}\tan^2 t$

At $t'=\frac{3\pi}{4},\ \frac{dy}{dx}=\frac{-b}{a}\tan^2\frac{3\pi}{4}=\frac{-b}{a}\left(1\right)$

$=\frac{-b}{a}$

Video Solution:

Q24 Text Solution:

Let $u=\sin(x^3)$ and $v=\cos(x^3)$

Now, $\frac{du}{dv}=\frac{du/dx}{dv/dx}=\frac{3x^2\cos\left(x^3\right)}{-3x^2\sin\left(x^3\right)}$

$\therefore\ \frac{du}{dv}=-\cot\left(x^3\right)$

Video Solution:

Q25 Text Solution:

Given, $x=\sqrt{a^{\sin^{-1}t}}$ and $y=\sqrt{a^{\cos^{-1}t}}$

Now, $\frac{dx}{dt}=\frac{1}{2\cdot\sqrt{a^{\sin^{-1}t}}}\times a^{\sin^{-1}t}\left(\log a\right)\cdot\frac{1}{\sqrt{1-t^2}}$

$=\frac{1}{2x}x^2\left(\log a\right)\cdot\frac{1}{\sqrt{1-t^2}}=\frac{x}{2}\log a\cdot\frac{1}{\sqrt{1-t^2}}$

And $\frac{dy}{dt}=\frac{1}{2\cdot\sqrt{a^{\cos^{-1}t}}}\times a^{\cos^{-1}t}\log a\cdot\frac{-1}{\sqrt{1-t^2}}$

$=\frac{1}{2y}\times y^2\log a\cdot\left(-\frac{1}{\sqrt{1-t^2}}\right)=-\frac{y}{2}\log a\times\frac{1}{\sqrt{1-t^2}}$

$So,\ \frac{dy}{dx}=-\frac{y}{x}$

Video Solution:

Q26 Text Solution:

Let $u=\log_{10}x$ and $v=\log_x 10$

By change of base property

$u=\frac{\log x}{\log 10}\qquad v=\frac{\log 10}{\log x}$

Now, differentiating u and v w.r.t. 'x'

$\frac{du}{dx}=\frac{1}{x\cdot\log 10}\ \frac{dv}{dx}=\frac{-\log 10}{x\cdot(\log x)^2}$

$\therefore\ \frac{du}{dv}=\frac{\frac{du}{dx}}{\frac{dv}{dx}}=-\left(\log_{10}x\right)^2$

Video Solution:

Q27 Text Solution:

$y=\sec^{-1}\left(\frac{1}{2x^2-1}\right), z=\sqrt{1+3x}$ Put $x = \cos\theta$ in y

$\therefore y=\sec^{-1}\left(\frac{1}{2\cos^2\theta-1}\right)=\sec^{-1}\left(\frac{1}{\cos 2\theta}\right)$

$=\sec^{-1}(\sec 2\theta)$

$=2\theta=2\cos^{-1}x \Rightarrow \frac{dy}{d\theta}=\frac{-2}{\sqrt{1-x^2}}$

$z=\sqrt{1+3x} \Rightarrow \frac{dz}{dx}=\frac{3}{2\sqrt{1+3x}}$

Here $\frac{dz}{dx}$ does not exists at $x=\frac{-1}{3}$

Video Solution:

Q28 **Text Solution:**

Let $u=\sin^{-1}\left(2x\sqrt{1-x^2}\right)$ and v

$=\tan^{-1}\left(\frac{8x}{\sqrt{1-x^2}}\right)$

Use $x=\sin\theta \Rightarrow \theta=\sin^{-1}(x)$

Video Solution:

Q29 **Text Solution:**

$\frac{dx}{dt}=a\cos t+b\sin t$ and $\frac{dy}{dt}=-a\sin t+b\cos t$

$\therefore \frac{dy}{dx}=\frac{b\cos t-a\sin t}{a\cos t+b\sin t}=\frac{-x}{y}$

$\therefore \frac{d^2y}{dx^2}=-\left[\frac{y(1)-x\cdot y_1}{y^2}\right]$

$\frac{d^2y}{dx^2}=-\left[\frac{y^2+x^2}{y^3}\right]$

Video Solution:

Q30 **Text Solution:**

$\mathrm{u}=\sin\mathrm{x}; \mathrm{v}=\log\mathrm{x} \therefore \frac{\mathrm{du}}{\mathrm{dv}}=\frac{\cos\mathrm{x}}{\left(\frac{1}{\mathrm{x}}\right)}=\mathrm{x}\cos\mathrm{x}$

Video Solution: