

Open Mind Guruji

Function: Lecture 04

Q.27 If $f(x) = \frac{2x+5}{3x-4}$ ✓

If $t = \frac{5+4x}{3x-2}$ show that $f(t) = x$

→ given

$$f(x) = \frac{2x+5}{3x-4} \quad \text{--- (1)}$$

Put $x=t$ in eq (1)

$$f(t) = \frac{2t+5}{3t-4} \quad \text{--- (2)}$$

Put $t = \frac{5+4x}{3x-2}$ in eq (2)

$$f(t) = \frac{2\left[\frac{5+4x}{3x-2}\right]+5}{3\left[\frac{5+4x}{3x-2}\right]-4}$$

$$= \frac{\frac{2(5+4x)}{(3x-2)}+5}{\frac{3(5+4x)}{(3x-2)}-4}$$

$$= \frac{\frac{2(5+4x)+5(3x-2)}{(3x-2)}}{\frac{3(5+4x)-4(3x-2)}{(3x-2)}}$$

$$f(t) = \frac{2(5+4x)+5(3x-2)}{3(5+4x)-4(3x-2)}$$
$$= \frac{10+8x+15x-10}{15+12x-12x+8}$$

$$f(t) = \frac{2/3x}{2/3}$$

$$f(t) = x$$



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Q.33. If $f(t) = 50 \sin(100\pi t + 0.4)$

Show that $f\left(\frac{2}{100} + t\right) = f(t)$

→

$$f(t) = 50 \sin(100\pi t + 0.4) \quad \text{--- (1)}$$

Put $t = \left(\frac{2}{100} + t\right)$ in eq (1)

$$f\left(\frac{2}{100} + t\right) = 50 \sin\left[100\pi\left(\frac{2}{100} + t\right) + 0.4\right]$$
$$= 50 \sin\left[100\pi \times \frac{2}{100} + 100\pi t + 0.4\right]$$
$$= 50 \sin\left[2\pi + 100\pi t + 0.4\right]$$

$$f\left(\frac{2}{100} + t\right) = 50 \sin\left[2\pi + 100\pi t + 0.4\right]$$

$$\left[\sin(2\pi + \theta) = \sin \theta\right]$$

$$f\left(\frac{2}{100} + t\right) = 50 \sin[100\pi t + 0.4]$$

$$f\left(\frac{2}{100} + t\right) = f(t) \quad \text{from eq (1)}$$