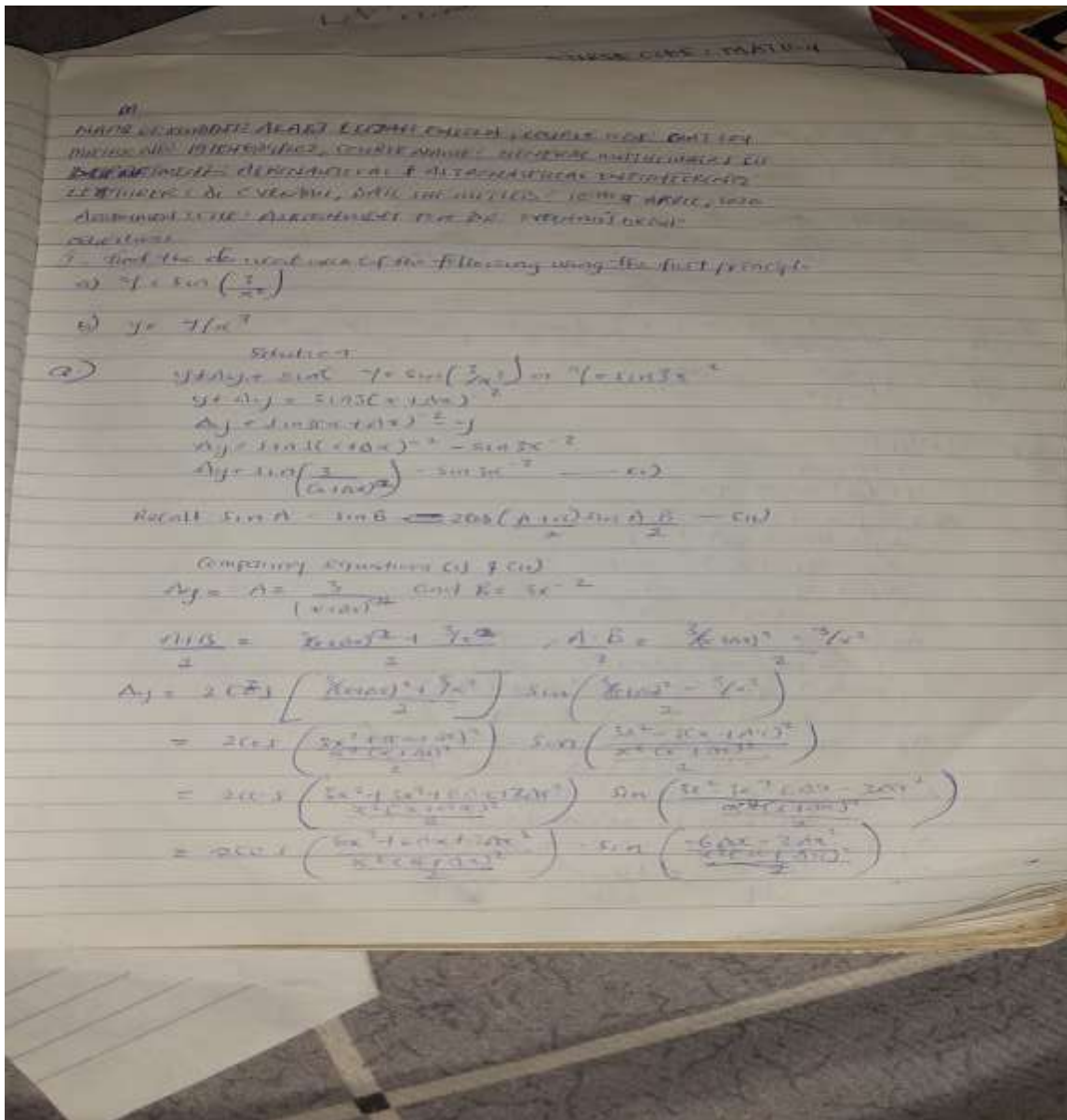
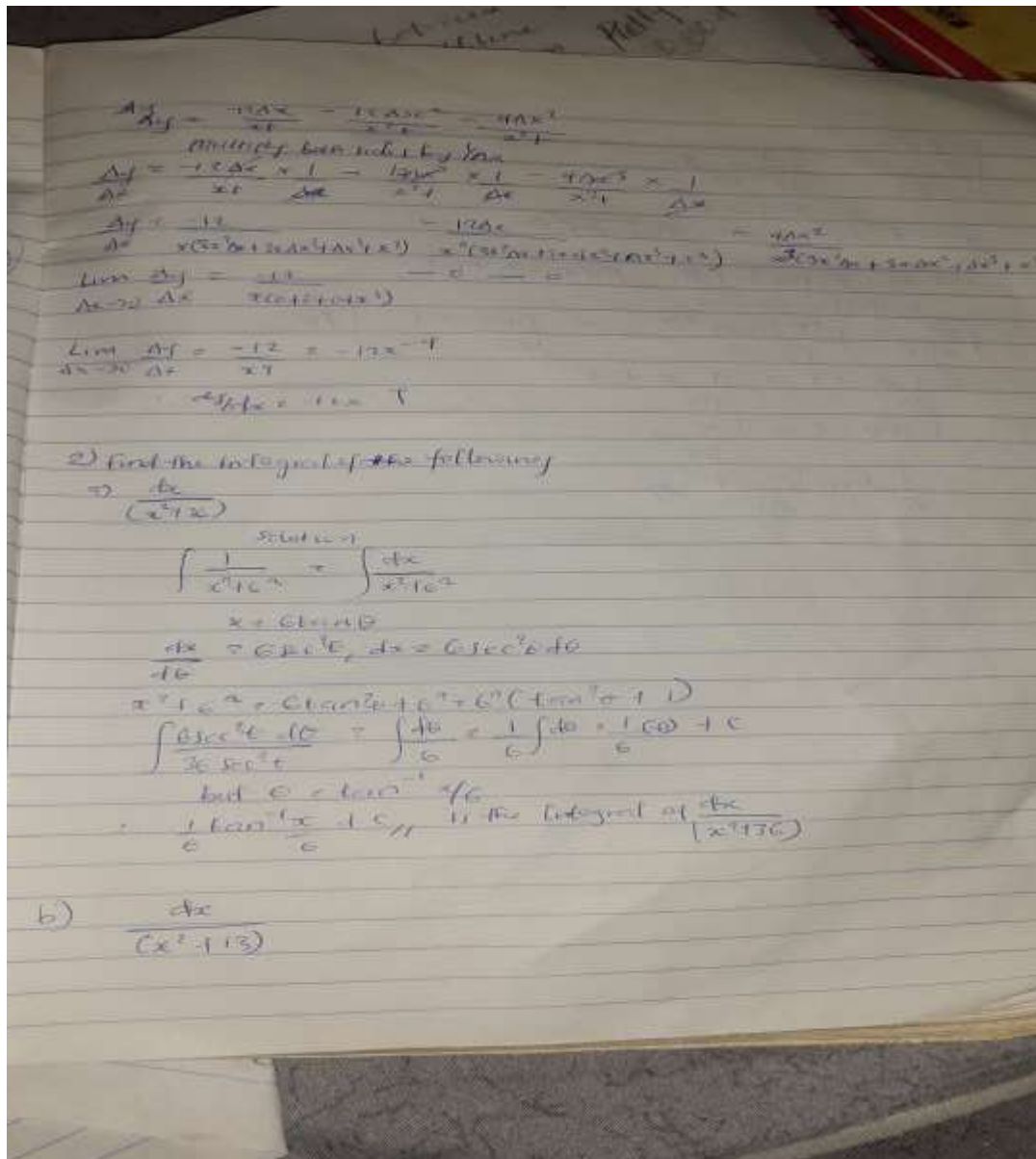


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change through by Δx

$$\frac{\Delta y}{\Delta x} = 2 \cos\left(\frac{3x^2 + 6x + 3}{2}\right) = 2 \cos\left(\frac{3x^2 + 6x + 3}{2}\right)$$

Multiply the Numerator and Denominator by $\frac{1}{2}$

$$\frac{\Delta y}{\Delta x} = \frac{1}{2} \times 2 \cos\left(\frac{3x^2 + 6x + 3}{2}\right) = \cos\left(\frac{3x^2 + 6x + 3}{2}\right)$$

$\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \cos\left(\frac{3x^2 + 6x + 3}{2}\right)$, $\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \cos\left(\frac{3x^2 + 6x + 3}{2}\right)$

$$\frac{dy}{dx} = \cos\left(\frac{3x^2 + 6x + 3}{2}\right) = \cos\left(\frac{3x^2 + 6x + 3}{2}\right)$$

6) $y = x^{1/2}$

Solution \rightarrow

$$y = x^{1/2} \Rightarrow y = \sqrt{x}$$

$$\Delta y = \sqrt{x + \Delta x} - \sqrt{x}$$

$$\Delta y = \frac{(\sqrt{x + \Delta x})^2 - (\sqrt{x})^2}{\sqrt{x + \Delta x} + \sqrt{x}} = \frac{x + \Delta x - x}{\sqrt{x + \Delta x} + \sqrt{x}} = \frac{\Delta x}{\sqrt{x + \Delta x} + \sqrt{x}}$$

$$\frac{\Delta y}{\Delta x} = \frac{1}{\sqrt{x + \Delta x} + \sqrt{x}}$$

$$\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \frac{1}{\sqrt{x + 0} + \sqrt{x}} = \frac{1}{2\sqrt{x}}$$

$$\frac{dy}{dx} = \frac{1}{2\sqrt{x}} = \frac{1}{2}x^{-1/2}$$

$$\frac{dy}{dx} = \frac{1}{2}x^{-1/2} = \frac{1}{2}x^{-1/2}$$

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Solution

$$\int \frac{dx}{x^2 + \sqrt{3}} = \int \frac{1}{x^2 + \sqrt{3}} dx$$

$$x = \sqrt{3} \tan \theta$$

$$\frac{dx}{d\theta} = \sqrt{3} \sec^2 \theta, \quad dx = d\theta \sqrt{3} \sec^2 \theta$$

$$x^2 + \sqrt{3} = \sqrt{3} \tan^2 \theta + \sqrt{3} = \sqrt{3} (\tan^2 \theta + 1)$$

by factorization

$$\int \frac{dx}{x^2 + \sqrt{3}} = \int \frac{d\theta \sqrt{3} \sec^2 \theta}{\sqrt{3} \sec^2 \theta} = \int \frac{d\theta}{\sqrt{3}} = \frac{1}{\sqrt{3}} \int d\theta$$

$$= \frac{1}{\sqrt{3}} \theta + C = \frac{1}{\sqrt{3}} \theta + C$$

$$\text{but } \theta = \tan^{-1} \frac{x}{\sqrt{3}}$$

$$= \frac{1}{\sqrt{3}} \tan^{-1} \frac{x}{\sqrt{3}} + C //$$