

Question 8

Evaluate the integral

$$\int \frac{3x^2}{1+x^3} \sqrt{\ln(1+x^3)} dx.$$

Question 8 - Solution

Use substitution. Let

$$u = \ln(1 + x^3).$$

Then

$$du = \frac{3x^2}{1 + x^3} dx.$$

Substitute into the integral:

$$\int \frac{3x^2}{1 + x^3} \sqrt{\ln(1 + x^3)} dx = \int \sqrt{u} du.$$

Integrate:

$$\int u^{1/2} du = \frac{2}{3} u^{3/2}.$$

Substitute back:

$$\boxed{\frac{2}{3} (\ln(1 + x^3))^{3/2} + C}$$