

$$\int u dv = uv - \int v du$$

Determine the antiderivative of each of the following. Confirm your answer by differentiation. Which is u ? Let LIATE (or LIPET) be your guide!

1. LIATE (LIPET)

- (a) Logs
- (b) Inverse Trig
- (c) Algebraic (Polynomials)
- (d) Trig (Exp)
- (e) Exponential (Trig)

4.

$$\int z^2 \cos z dz$$

2.

$$\int x \sin x dx$$

5.

$$\int x^3 e^{-2x} dx$$

3.

$$\int y \ln y dy$$

6.

$$\int_0^{\pi/2} x^2 \sin 2x \, dx$$

7.

$$\int_{-3}^2 e^{-2x} \sin 2x \, dx$$

Answers:

$$2. \sin(x) - x \cos(x) + C$$

$$3. \frac{1}{8} \ln|x| - \frac{1}{4} x^2 + C$$

$$4. \frac{1}{2} \sin x - \frac{1}{2} x \cos x + \frac{1}{2} \cos x + C$$

$$5. \frac{1}{8} e^{-2x} (x^2 + 2x + 1) + C$$

$$6. \frac{1}{2} x \sin(x) - (1 - x^2) \cos(x) + \frac{\pi}{2}$$

$$7. \frac{1}{4} e^{-2x} (\sin(x) + \cos(x)) + C$$