

The questions below may require that you use one or more of the following techniques:

u-substitution

integration by parts

trigonometric substitution

trigonometric identities

trigonometric reduction formulae

$$[1] \quad \int x^2 \sqrt{1+x^2} \, dx$$

$$[2] \quad \int \tan^4 x \sec^6 x \, dx$$

$$[3] \quad \int x^2 \arcsin 2x^3 \, dx$$

$$[4] \quad \int (x-1)\sqrt{1-2x} \, dx$$

$$[5] \quad \int \sqrt{x} (\ln x)^3 \, dx$$

$$[6] \quad \int x^3 \sqrt{4-x^2} \, dx$$

$$[7] \quad \int (x^2 \sin 3x - 2x \cos 4x) \, dx$$

$$[8] \quad \int x^2 \sqrt{6-4x^2} \, dx$$

$$[9] \quad \int \frac{\sqrt{2x^2-12x}}{x^2} \, dx$$

$$[10] \quad \int e^{-5x} \cosh 3x \, dx$$

$$[11] \quad \int \sin^5 x \cos^7 x \, dx$$

$$[12] \quad \int (1+2x-x^3)e^{-2x} \, dx$$

$$[13] \quad \int e^{-3x} \sin 2x \, dx$$

$$[14] \quad \int \frac{(\ln x)^3}{x} \, dx$$

You **may or may not** need the following reduction formulae:

$$\text{if } n \neq 0: \quad \int \sin^n u \, du = -\frac{1}{n} \sin^{n-1} u \cos u + \frac{n-1}{n} \int \sin^{n-2} u \, du$$

$$\int \cos^n u \, du = \frac{1}{n} \cos^{n-1} u \sin u + \frac{n-1}{n} \int \cos^{n-2} u \, du$$

$$\text{if } n \neq 1: \quad \int \sec^n u \, du = \frac{1}{n-1} \sec^{n-2} u \tan u + \frac{n-2}{n-1} \int \sec^{n-2} u \, du$$

