

1. Integrate the following:

a) $\int (3x^3 - 5x^2 + 7)e^{-3x} dx$

b) $\int (7x^2 - 3x + 5)\sin(3x) dx$

c) $\int (3\sqrt{x^3} - 2\sqrt[3]{x^5} + 2)\ln(7x) dx$

d) $\int e^{2x+1} \cos(3x) dx$

e) $\int \cos(\ln(2x)) dx$

f) $\int \tan^{-1}(5x) dx$

g) $\int \ln(7x-3) dx$

h) $\int e^{\sqrt[3]{x}} dx$

2. Prove the reduction formula:

a)
$$\int \cos^n x dx = \frac{1}{n} \cos^{n-1} x + \frac{n-1}{n} \int \cos^{n-2} x dx$$

b)
$$\int \tan^n x dx = \frac{\tan^{n-1} x}{n-1} - \int \tan^{n-2} x dx$$

3. Use the reduction formulas from problem #2, to integrate the following:

a) $\int \cos^4(3x) dx$

b) $\int \tan^3(2x) dx$