u-substitution

Integrate the following without using u-substitution. That is, any substitution must be done mentally only.

(a) $\int e^{x/2}\,dx$

(b) $\int \sin 5x\,dx$

(c) $\int \sec^2 2x\,dx$

(d) $\int 2^{3x}\,dx$

(e) $\int \dfrac{dx}{2x-3}$

(f) $\int (x+9)^3\,dx$

More u-substitution

Integrate the following:

(a) $\int 2x\sqrt{x^2+3}\,dx$

(b) $\int \dfrac{3x}{\sqrt{2x^2+3}}\,dx$

(c) $\int \dfrac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

(d) $\int \dfrac{dx}{\sqrt{9-x^2}}$

(e) $\int \dfrac{e^t}{9+e^{2t}}\,dx$

(f) $\int \sqrt{1-4x^2}\,dx$ [Hint: Let $x = \dfrac{\sin\theta}{2}$]

Integration by Parts

Integrate the following:

(a) $\int x^3 \ln x \; dx$

(b) $\int x \sin x \cos x \; dx$

(c) $\int \frac{\ln x}{x^2} \; dx$

(d) $\int x^2 \sqrt{x-1} \; dx$

(e) $\int \arccos x \; dx$

Tabular Integration

Integrate the following by using Tabular Integration:

$$\int x^4 e^{x/2} \; dx$$

“Looping" Integrals

Integrate the following:

$$\int e^{5x} \cos 2x \; dx$$