

(1) Do the following integrals using the simple substitution rule rule $\int f(mx+k) dx = \frac{1}{m} F(mx+k) + c$

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

$$= \frac{1}{3} \sin 3x + c$$

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

$$= -\frac{1}{2} e^{3-2x} + c$$

(c) $\int \cos\left(\frac{\pi x}{2}\right) dx$

$$= \frac{2}{\pi} \sin\left(\frac{\pi x}{2}\right) + c$$

(d) $\int \frac{7}{1+3t} dt$

$$= \frac{7}{3} \ln |1+3t| + c$$

(e) $\int \frac{1}{1+9x^2} dx$

$$= \int \frac{1}{1+(3x)^2} dx = \frac{1}{3} \arctan 3x + c$$

(f) $\int (1+x)^{100} dx$

$$= \frac{1}{101} (1+x)^{101} + c$$

(g) $\int \sqrt[3]{1-2x} dx$

$$= \frac{1}{2} \cdot \frac{3}{4} (1-2x)^{4/3} + c = \frac{3}{8} (1-2x)^{4/3} + c$$