

Tabular

$$\int x^2 (3x+1)^{1/2} dx$$

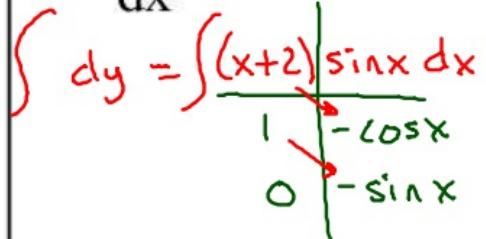
| | |
|-------|------------------------------|
| x^2 | $(3x+1)^{1/2}$ |
| $2x$ | $\frac{2}{9}(3x+1)^{3/2}$ |
| 2 | $\frac{4}{135}(3x+1)^{5/2}$ |
| 0 | $\frac{8}{2835}(3x+1)^{7/2}$ |

$$= \boxed{\frac{2}{9}x^2(3x+1)^{3/2} - \frac{8x}{135}(3x+1)^{5/2} + \frac{16}{2835}(3x+1)^{7/2} + C}$$

$$\frac{12}{15} \cdot \frac{2}{3}$$
$$\frac{2}{7} \cdot \frac{1}{3} \cdot \frac{4}{135}$$

Solve the initial value problem

$$11. \frac{dy}{dx} = (x+2)\sin x \quad y=2 \text{ and } x=0$$



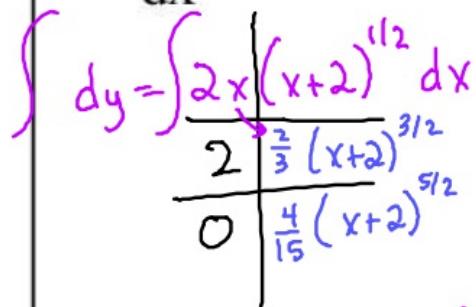
$$y = -(x+2)\cos x + \sin x + C$$

$$2 = -2 + C$$

$$4 = C$$

$$y = -(x+2)\cos x + \sin x + 4$$

$$16. \frac{dy}{dx} = 2x\sqrt{x+2} \quad y(-1) = 0$$



$$y = \frac{4x}{3}(x+2)^{3/2} - \frac{8}{15}(x+2)^{5/2} + C$$

$$0 = -\frac{4}{3} - \frac{8}{15} + C$$

$$y = \frac{4x}{3}(x+2)^{3/2} - \frac{8}{15}(x+2)^{5/2} + \frac{28}{15}$$

$$0 = -\frac{28}{15} + C$$

Use tabular integration to integrate the following

$$10. \int x^2 \ln x dx = \int \ln x \left| \begin{array}{c} x^2 \\ \frac{1}{x} \end{array} \right. dx \rightarrow \left| \begin{array}{c} x^2 \\ \frac{1}{3}x^3 \end{array} \right.$$

$$\begin{aligned}\int x^2 \ln x &= \frac{1}{3}x^3 \ln x - \int \frac{1}{x} \cdot \frac{1}{3}x^3 dx \\ &= \frac{1}{3}x^3 \ln x - \left[\int \frac{1}{3}x^2 dx \right] \\ &= \boxed{\frac{1}{3}x^3 \ln x - \frac{1}{9}x^3 + C}\end{aligned}$$

Use ultra violet minus super vdu to integrate the following

$$10. \int x^2 \ln x dx$$

$$\int \arcsin(x) dx$$

Use tabular integration to integrate the following

$$\begin{aligned}
 A. \int \arcsin(x) dx &= x \arcsin x - \int \frac{x}{\sqrt{1-x^2}} \\
 &\quad \xrightarrow{\text{Integration by parts}} \\
 &= x \arcsin x - \int x (1-x^2)^{-1/2} \\
 &\quad \boxed{= x \arcsin x + (1-x^2)^{1/2} + C}
 \end{aligned}$$

19. $\int e^x \cos(2x) dx$