

AP Calculus AB

The Definite Integral

$$1) \int_0^1 (5x + \sqrt{x}) dx$$

$$\left[\frac{5}{2}x^2 + \frac{2}{3}x^{3/2} + C \right]_0^1$$

$$\left[\frac{5}{2} + \frac{2}{3} \right] - [0 + 0]$$

$$\boxed{\frac{5}{2} + \frac{2}{3}}$$

$$2) \int_{\pi/3}^{3\pi/4} \sin x dx$$

$$[-\cos x + C]_{\pi/3}^{3\pi/4}$$

$$\left[-\cos \frac{3\pi}{4} \right] - \left[-\cos \frac{\pi}{3} \right]$$

$$\boxed{\frac{\sqrt{2}}{2} - \left(-\frac{1}{2} \right)}$$

$$3) \int_3^4 (2x^3 + 9) dx$$

$$\left[\frac{1}{2}x^4 + 9x + C \right]_3^4$$

$$\left[\frac{1}{2}(4)^4 + 9(4) \right] - \left[\frac{1}{2}(-3)^4 + 9(-3) \right]$$

$$[128 + 36] - \left[\frac{81}{2} - 27 \right]$$

$$4) \int_1^8 x^{-5/3} dx$$

$$\left[-\frac{3}{2}x^{-2/3} + C \right]_1^8$$

$$\left[-\frac{3}{2}(8)^{-2/3} \right] - \left[-\frac{3}{2} \right]$$

$$\boxed{-\frac{3}{8} + \frac{3}{2}}$$

$$5) \int_{1/2}^4 x^{-2} dx$$

$$[-x^{-1} + C]_{1/2}^4$$

$$\left[-\frac{1}{4} \right] - [-2]$$

$$\boxed{\frac{7}{4}}$$

$$6) \int_0^{\pi/3} 7\sec^2 x dx$$

$$[7\tan x + C]_0^{\pi/3}$$

$$[7\tan \frac{\pi}{3}] - [7\tan 0]$$

$$\boxed{7(\sqrt{3})}$$

$$7) \int_1^6 3t^{-1} dt$$

$$[3\ln t + C]_1^6$$

$$(3\ln 6) - (3\ln 1)$$

$$3\ln 6 - 0$$

$$\boxed{3\ln 6}$$

$$8) \int_0^{\pi/42} \cos 7x dx$$

$$\left[\frac{1}{7} \sin 7x + C \right]_0^{\pi/42}$$

$$\left(\frac{1}{7} \sin \frac{\pi}{6} \right) - \left(\frac{1}{7} \sin 0 \right)$$

$$\boxed{\frac{1}{14}}$$

$$9) \int_0^5 6e^{3x} dx$$

$$\left[2e^{3x} + C \right]_0^5$$

$$\boxed{(2e^{15}) - (2)}$$

$$10) \int_0^1 3x^2(2-x^3) dx$$

$$\left[-\frac{1}{2}(2-x^3)^2 + C \right]_0^1$$

check
 $2(2-x^3)(-3x^2)$

$$\left(-\frac{1}{2}(1) \right) - \left(-\frac{1}{2}(4) \right)$$

$$\boxed{-\frac{1}{2} + 2}$$

$$11) \int_0^2 16x^3 e^{x^4} dx$$

$$\left[4e^{x^4} + C \right]_0^2$$

check
 $e^{x^4} \cdot 4x^3$

$$(4e^{16}) - (4e^0)$$

$$\boxed{4e^{16} - 4}$$

$$12) \int_0^2 (x^3+5)^{-1} x^2 dx$$

$$\left[\frac{1}{3} \ln(x^3+5) + C \right]_0^2$$

check:
 $\frac{3x^2}{x^3+5}$

$$\left(\frac{1}{3} \ln(13) \right) - \left(\frac{1}{3} \ln 5 \right)$$

$$\boxed{\frac{1}{3} \ln\left(\frac{13}{5}\right)}$$

* LOG PROPERTY
 $\log A - \log B$
 $\log \frac{A}{B}$

CALCULATOR

$$13) \int_0^9 \frac{1}{4+3\sin x} dx = 2.829$$