Calculus Review Worksheet

Evaluate each of the following integrals please.

(1) $\int x^2 \ln(x)\, dx$

(2) $\int 5x \sin(2x - 1)\, dx$

(3) $\int \sin(x) \sin(3x)\, dx$

(4) $\int xe^{2x}\, dx$

(5) $\int x \cos(2x)\, dx$

(6) $\int \ln\left(x^2 + 1\right) dx$

(7) $\int \frac{\sqrt{9 - x^2}\, dx}{x^2}$

(8) $\int \frac{\sqrt{x^2 - 25}\, dx}{x^2}$

(9) $\int \frac{x^3\, dx}{\sqrt{x^2 + 4}}$

(10) $\int \frac{dx}{1 - x^2}$

(11) $\int \frac{dx}{\left(9 + x^2\right)^2}$

(12) $\int \frac{4x^2\, dx}{\left(4 - x^2\right)^{\frac{3}{2}}}$

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Answers

(1) $\frac{1}{3}x^3\ln(x) - \frac{1}{9}x^3 + C$

(2) $-\frac{5}{2}x\cos(2x-1) + \frac{5}{4}\sin(2x-1) + C$

(3) $\frac{1}{8}\cos(x)\sin(3x) - \frac{3}{8}\sin(x)\cos(3x) + C$

(4) $\frac{1}{2}xe^{2x} - \frac{1}{4}e^{2x} + C$

(5) $\frac{1}{2}x\sin(2x) + \frac{1}{4}\cos(2x) + C$

(6) $x\ln\left(x^2+1\right) - 2x + 2\tan^{-1}(x) + C$

(7) $-\frac{\sqrt{9-x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + C$

(8) $\ln\left|x + \sqrt{x^2+25}\right| - \frac{\sqrt{x^2+25}}{x} + C$

(9) $\frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}} - 4\sqrt{x^2+4} + C$

(10) $\ln\left|\frac{1+x}{\sqrt{1-x^2}}\right| + C$

(11) $\frac{1}{54}\tan^{-1}\left(\frac{x}{3}\right) + \frac{x}{18\left(9+x^2\right)} + C$

(12) $\frac{4x}{\sqrt{4-x^2}} - 4\sin^{-1}(x) + C$