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Examen Integral Parcial 1 30/sep/2020

1) $\int \left(\frac{2a}{\sqrt{x}} - \frac{b}{x^2} + 3c \sqrt[3]{x^2} \right) dx$

$\int \frac{2a}{\sqrt{x}} - \int \frac{b}{x^2} + \int 3c \sqrt[3]{x^2}$

$2a \int (x)^{1/2} - b \int (x)^2 + 3c \int (x^2)^{1/3}$

$\frac{u^{n+1}}{n+1}$

$2a \frac{(x)^{3/2}}{\frac{3}{2}} - b\frac{(x)^{2+1}}{2+1} + (x^2)^{1/3}$

$\frac{2a}{1} \frac{2(x)^{3/2}}{3} - b\frac{(x)^3}{3} \quad \frac{(x)^{2/3+1}}{\frac{2}{3}+1} \quad \frac{(x)^{5/3}}{\frac{5}{3}}$

$\frac{4a(x)^{3/2}}{3} - \frac{b(x)^3}{3} + 3c \frac{3(x)^{5/3}}{5} = \frac{9c(x)^{5/3}}{5}$

$\boxed{\frac{4a(x)^{3/2}}{3} - \frac{b(x)^3}{3} + \frac{9c(x)^{5/3}}{5} + c}$

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(3) $\int x\, 10x^2\, dx$

$\int 10x^3\, dx \quad \frac{u^{n+1}}{n+1}$

$\int \frac{10x^4}{4} = \boxed{\frac{5x^4}{2} + C}$

(4) $\int \frac{\cos\theta}{4-\sin^2\theta}\, d\theta \quad -\int \frac{\cos\theta}{\operatorname{sen}^2\theta - 4}\, dx \quad -\int \frac{du}{u}$

$\boxed{= -\ln(4-\operatorname{sen}\theta) + C}$

$u = 4-\operatorname{sen}\theta$

$du = -\cos\theta$

⑥ $\int_5^7 \frac{x^5+x^4+x^3+x^2+1}{x^2+1}\,dx = \frac{1}{x^2+1}\,dx$

$$
\begin{array}{r|l}
 & x^3+x^2 \\
x^2+1 & x^5+x^4+x^3+x^2+1 \\
 & \cancel{-x^5} \quad \cancel{-x^3} \\
 & x^4+x^2+1 \\
 & \cancel{-x^4}-x^2+1 \\
 & 1
\end{array}
$$

$\int x^2+1\,dx$

$\int x^2 \frac{u^{n+1}}{n+1} + \int dx$

$\boxed{\int \frac{x^3}{3} + x + c} = \frac{5}{3} + 5 + \frac{7}{3} + 7 = 16$

(7) $\int_0^1 y(y^2+1)^5\,dy$

$u = y^2+1$

$du = 2y$

$\frac{du}{2} = y\,dy$

$\frac{1}{2}\int_0^1 y^5\,dy = \frac{1}{2}\int \frac{y^6}{6} = \boxed{\frac{(y^2+1)^6}{12} + C}$

(8) $\int_2^8 \frac{x+2}{\sqrt{x^2+4x}}\,dx$

$\int \frac{1}{2\sqrt{\alpha}} = \frac{1}{2}\int \frac{1}{\sqrt{x}}$

$u = x^2+4x$

$du = 2x+4\,dx$

$\frac{du}{2x+4} = dx$

$= 2\sqrt{x}$

$\frac{1}{2}\int \frac{1}{\sqrt{x}}\,dx$

$= \sqrt{x}$

$\boxed{= \sqrt{x^2+4x} + C}$