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a) $\int x^2 \cdot dx$

$\int x^n dx = \frac{x^{n+1}}{n+1}, n \neq 1$

$\frac{x^{2+1}}{2+1} = \frac{x^3}{2+1} = \frac{x^3}{3} = \frac{x^3}{3} + C$

b) $\int \frac{1}{x^2} dx \int \frac{1}{x^n} dx = -\frac{1}{(n-1) \cdot x^{n-1}}, n \neq 1$

$\frac{-1}{(2-1)x^{2-1}} = \frac{1}{1x^{2-1}} = -\frac{1}{1x^1} = \frac{-1}{x} + C$

c) $\int 2x^{3/3} dx \int a \cdot f(x) dx = a \cdot \int f(x) dx = \int x^n dx = \frac{x^{n+1}}{n+1}, n \neq 1$

$2x \frac{x^{\frac{3}{3}+1}}{\frac{3}{3}+1} = 2x \frac{x^{\frac{3}{3}}}{\frac{3}{3}+1} = 2x \frac{x^{\frac{3}{3}}}{\frac{5}{3}} = \frac{2x^{\frac{3}{3}} \cdot 3}{3} = \frac{2x3x\sqrt[3]{x^2}}{5} = \frac{6x\sqrt[3]{x^2}}{5} + C$

d) $\int \frac{4x^3+2x^2-x+3}{x} dx = \int \frac{4x^3}{x} + \frac{2x^2}{x} - \frac{x}{x} + \frac{3}{x} dx$

$\int \frac{4x^3}{3} + \int 2x dx - \int 1 dx + \int \frac{3}{x} dx = x^4 + \frac{2x^3}{3} - \frac{x^2}{2} + 3x + C$

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e) $\int \sqrt[3]{x^2} \cdot (x+3)^2 dx = dx \sqrt[3]{x^2} \cdot (x+3)^2 \rightarrow a+b = a^2 + 2ab$

$= dx \sqrt[3]{x^2} \cdot (x^2 + 6x + 9) = dx \sqrt[3]{x^2} x^2 dx \sqrt[3]{x^2} \cdot 6x + 9 dx \sqrt[3]{x^2}$

$= dx 3\sqrt[3]{x^2} + 6 dx^2 \sqrt[3]{x^2} + 9 dx \sqrt[3]{x^2}$

F) $\int \sqrt{x} (x + 1/x) dx = \int \sqrt{x} \cdot \frac{x^2+1}{x} dx = \frac{\sqrt{x^2+1}}{\sqrt{x}} dx$

$\int \frac{x^2+1}{x^{\frac{1}{2}}} dx \int \frac{x^2}{x^{\frac{1}{2}}} + \frac{1}{x^{\frac{1}{2}}} dx = \int x^{\frac{3}{2}} + \frac{1}{x^{\frac{1}{2}}} = \frac{2x^2\sqrt{x}}{5} + 2\sqrt{x} + C$

G) $\int \frac{x^2+1}{x} = \frac{\sqrt{x^2+1}}{\sqrt{x}} = \frac{\sqrt{x^2+1}}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}} = \frac{\sqrt{(x^2+1)x}}{x}$

$\frac{\sqrt{x^3+x}}{x} = \int \frac{x^2+1}{x} dx = \frac{x^2}{2} + \ln|x| + C$

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h) $\int \frac{3}{x^5}\,dx = \int \frac{1}{x^n}\,dx = \frac{1}{(n-1)\cdot x^{n-1}},\ n \neq 1 = 3\left(-\frac{1}{4x^4}\right)$

$3x\left(\frac{-1}{4x^4}\right) \to -\frac{3}{4x4} = \frac{-3}{4x^4} + C$

I) $\int \frac{y^4 + 2y^2 - y + 5}{\sqrt{y}}\,dx = \frac{y^4 + 2y^2 + 4}{\sqrt{y}}\,dx$

$\frac{dx\,(y^4 + 2\sqrt{y}\,y^2 + 1)}{\sqrt{y}} = dx \cdot y^4 + 2dy^2 + 1dx$

J) $\int \frac{4x^3 + 2x^2 - x + 3}{x^2}\,dx$

$\frac{1}{2} \cdot \int 4x^3 + 2x^2 - x + 3\,dx$

$\frac{1}{2} \cdot \left(\int 4x^3\,dx + \int 2x^2\,dx - \int x\,dx + \int 3\,dx\right)$

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

$\frac{1}{2}\,x^4 + \frac{x^3}{3} - \frac{x^4}{4} + \frac{3}{2}x$

$\frac{1}{2}\,x^4 + \frac{x^3}{3} - \frac{x^2}{4} + \frac{3}{2}x + C$

b) $\int x^4 + 2x^2 - \sqrt{x} + 3dx = \frac{x^5}{5} + 2\frac{x^3}{3} - \frac{x^2}{2} + 3x + C$

b) $\int \frac{4x^3 + 2x^2 - x + 3}{x^2}\,dx = 2x^2 + 2x - \ln|x| - \frac{3}{x} + C$