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(8)

$$a) \int \frac{x^4 + 4x^2 + 3}{x^2 + 1} dx = \int \frac{(x^2 + 1)(x^2 + 3)}{x^2 + 1} dx =$$

$$(x^4 + 4x^2 + 3) : (x^2 + 1) = x^2 + 3$$

$$\begin{array}{r} \ominus x^4 \oplus x^2 \\ \hline 3x^2 + 3 \\ \ominus (3x^2 + 3) \\ \hline 0 \end{array}$$

$$= \int (x^2 + 3) dx = \int x^2 dx + \int 3 dx = \underline{\underline{\frac{x^3}{3} + 3x + C}}$$

$$b) \int \frac{x^3 - 2x^2 - 7x + 14}{x - 2} dx = \int (x^2 - 7) dx = \underline{\underline{\frac{x^3}{3} - 7x + C}}$$

$$(x^3 - 2x^2 - 7x + 14) : (x - 2) = x^2 - 7$$

$$\begin{array}{r} \ominus x^3 \oplus 2x^2 \\ \hline 7x + 14 \\ \ominus (7x + 14) \\ \hline 0 \end{array}$$

$$c) \int \frac{\sqrt{x} - 2\sqrt{x^2} + 1}{\sqrt[4]{x}} dx = \int \frac{x^{\frac{1}{2}}}{x^{\frac{1}{4}}} dx - 2 \int \frac{x^{\frac{2}{2}}}{x^{\frac{1}{4}}} dx + \int \frac{1}{x^{\frac{1}{4}}} dx$$

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

$$= \int x^{\frac{1}{4}} dx - 2 \int x^{\frac{5}{4}} dx + \frac{x^{\frac{3}{4}}}{\frac{3}{4}} =$$

$$= \frac{x^{\frac{5}{4}}}{\frac{5}{4}} - 2 \cdot \frac{x^{\frac{9}{4}}}{\frac{9}{4}} + \frac{3 \sqrt[4]{x^3}}{4} + C = \underline{\underline{\frac{4x^{\frac{5}{4}}}{5} - \frac{24x^{\frac{9}{4}}}{17} + \frac{3\sqrt[4]{x^3}}{4} + C}}$$

$$\text{hebo} = \underline{\underline{\frac{4}{5} \cdot x \sqrt{x} - \frac{24}{17} \cdot x \sqrt[4]{x^5} + \frac{3}{4} \cdot \sqrt[4]{x^3} + C}}$$

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(9)

$$\begin{aligned}
 a) \int \left(1 - \frac{1}{x^2}\right) \cdot \sqrt{x} \sqrt{x} \, dx &= \int (1 - x^{-2}) \cdot (x \cdot x^{\frac{1}{2}})^{\frac{1}{2}} \, dx = \\
 &= \int (1 - x^{-2}) \left(x^{\frac{3}{2}}\right)^{\frac{1}{2}} \, dx = \int (1 - x^{-2}) \cdot x^{\frac{3}{4}} \, dx = \\
 &= \int \left(x^{\frac{3}{4}} - x^{-\frac{5}{4}}\right) \, dx = \frac{x^{\frac{7}{4}}}{\frac{7}{4}} - \frac{x^{-\frac{1}{4}}}{-\frac{1}{4}} + C = \\
 &= \frac{4 \cdot x^{\frac{7}{4}} \sqrt[4]{x^3}}{7} + 4 \cdot \frac{1}{x^{\frac{1}{4}}} + C = \frac{4x^2 \sqrt[4]{x^3}}{7} + \frac{4}{\sqrt[4]{x}} + C = \\
 &= \frac{4x \cdot \sqrt[4]{x^3}}{7} + \frac{4 \cdot \sqrt[4]{x^3}}{x} + C = \frac{4x^2 \sqrt[4]{x^3} + 28 \sqrt[4]{x^3}}{7x} + C = \\
 &= \frac{4 \cdot \sqrt[4]{x^3} (x^2 + 7)}{7x} + C
 \end{aligned}$$
