1. $\int \frac{x^2 + C}{x^3 + 3Cx + E} dx$
2. $\int \frac{x + B}{x^2 + 2Bx - D} dx$
3. $\int \frac{Ax^3}{Ax^2 - B} dx$
4. $\int \frac{x^4 - Bx^2 + Cx - D}{x^2 + Ax + A^2} dx$
5. $\int \frac{D}{x^2 + Cx + C^2} dx$

NIM	A	B	C	D	E
SK006	9	1	9	9	6

1. $\int \frac{x^2 + 9}{x^3 + 3.9x + 6} dx = \int \frac{x^2 + 9}{x^3 + 27x + 6} dx$
2. $\int \frac{x + 1}{x^2 + 2.1x - 9} dx = \int \frac{x + 1}{x^2 + 2x - 9} dx$
3. $\int \frac{9x^3}{9x^2 - 1} dx$
4. $\int \frac{x^4 - 1x^2 + 9x - 9}{x^2 + 9x + 9^2} dx = \int \frac{x^4 - x^2 + 9x - 9}{x^2 + 9x + 81} dx$
5. $\int \frac{9}{x^2 + 9x + 9^2} dx = \int \frac{9}{x^2 + 9x + 81} dx$

1. $\int \frac{x^2 + 9}{x^3 + 3.9x + 6} dx = \int \frac{x^2 + 9}{x^3 + 27x + 6} dx$

MISAL ; g(x) = $x^3 + 27\,x + 6$

g'(x) = $3\,x^2 + 27$

$\rightarrow \quad x^2 + 9 = \frac{1}{3}(3\,x^2 + 27)$

$$\int \frac{\frac{1}{3}g'(x)}{g(x)} dx = \frac{1}{3} \ln \mid x^3 + 27\,x + 6 \mid + C$$

2. $\int \frac{x + 1}{x^2 + 2.1x - 9} dx = \int \frac{x + 1}{x^2 + 2x - 9} dx$

MISAL ; g(x) = $x^2 + 2x - 9$

g'(x) = $2x + 2$

$\rightarrow \quad x + 1 = \frac{1}{2}(2x + 2)$

$$\int \frac{\frac{1}{2}g'(x)}{g(x)} dx = \frac{1}{2} \ln \mid x^2 + 2x - 9 \mid + C$$

3. $\int \frac{9x^3}{9x^2 - 1} dx$

$9x^2 - 1 \overline{)9x^3} \; x$

$9x^3 - x$

x ⟵ (sisa)

$\int (x + \frac{x}{9x^2 - 1}) dx$

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

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

- $\int \frac{x}{9x^2 - 1} dx$

MISAL ; $g(x) = 9x^2 - 1$

$g'(x) = 18x$

→ $x = \frac{1}{18}(18x) + C$

$\int \frac{\frac{1}{18} g'(x)}{g(x)} dx = \frac{1}{18} \ln |9x^2 - 1| + C$

$\int (x + \frac{x}{9x^2 - 1}) dx = \frac{1}{2} x^2 + \frac{1}{18} \ln |9x^2 - 1| + C$

4. $\int \frac{x^4 - 1x^2 + 9x - 9}{x^2 + 9x + 9^2} dx = \int \frac{x^4 - x^2 + 9x - 9}{x^2 + 9x + 81} dx$

$$
\begin{array}{r}
x^2 - 9x + 1 \\
x^2 + 9x + 81 \overline{)\,x^4 - x^2 + 9x - 9} \\
x^4 + 9x^3 + 81x^2 \quad - \\
\hline
-9x^3 - 82x^2 - 9 \\
-9x^3 - 81x^2 - 729x \quad - \\
\hline
x^2 + 729x - 9 \\
x^2 + 9x + 81 \quad - \\
\hline
720x - 90 \leftarrow \text{(sisa)}
\end{array}
$$

$$\int (x^2 - 9x + 1 + \frac{720x - 90}{x^2 + 9x + 81}) dx = \int (x^2 - 9x + 1) dx + \int (\frac{720x - 90}{x^2 + 9x + 81}) dx$$

- $\int (x^2 - 9x + 1) dx = \frac{1}{3} x^3 - 9 \frac{1}{2} x^2 + x + C$
- $\int (\frac{720x - 90}{x^2 + 9x + 81}) dx$

MISAL ; g(x) = $x^2 - 9x + 81$

g'(x) = 2x - 9

→ $720x - 90 = 360\ (2x - 9) + 3150$

$$\int \frac{360g'(x)+3150}{g(x)}dx = \int \frac{360g'(x)}{g(x)}dx + \int \frac{3150}{g(x)}dx$$

$$\int \frac{360g'(x)}{g(x)}dx = 360 \ln |x^2 - 9x + 81| + c$$

$$\int \frac{3150dx}{x^2 - 9x + 81}$$

2b = - 9

b = - 4,5

c = 81

p = $\sqrt{c - b^2}$

= $\sqrt{81 - (-4,5)^2}$

= $\sqrt{81 - 20,25}$

= $\sqrt{60,75}$

= 7,79

$$\int \frac{3150dx}{x^2 - 9x + 1} = \frac{1}{p} \arctan\left(\frac{x+b}{p}\right) + C$$

$$= \frac{3150}{\sqrt{60,75}} \arctan\left(\frac{x+\frac{9}{2}}{\sqrt{60,75}}\right) + C$$

$$\int \frac{x^4 - x^2 + 9x - 9}{x^2 + 9x + 81}dx = \int (x^2 - 9x + 1)dx + \int (\frac{720x - 90}{x^2 + 9x + 81})dx$$

$$= \frac{1}{3}x^3 - 9\,\frac{1}{2}x^2 + x + \int \frac{360g'(x)}{g(x)}dx + \int \frac{3150}{g(x)}dx$$

$$= \frac{1}{3}x^3 - 9\,\frac{1}{2}x^2 + x + 360 \ln |x^2 - 9x + 81| + \frac{1}{\sqrt{60,75}} \arctan (\frac{x + \frac{9}{2}}{\sqrt{60,75}}) + C$$

5. $\int \frac{9}{x^2 + 9x + 9^2}dx = \int \frac{9}{x^2 + 9x + 81}dx$

$2b = -9$

$b = -4,5$

$c = 81$

$p = \sqrt{c - b^2}$

$= \sqrt{81 - (-4,5)^2}$

$= \sqrt{81 - 20,25}$

$= \sqrt{60,75}$

$= 7,79$

$$\int \frac{9}{x^2 + 9x + 81}dx = \frac{1}{p} \arctan (\frac{x + b}{p}) + C$$

$$= \frac{9}{\sqrt{60,75}} \arctan (\frac{x + \frac{9}{2}}{\sqrt{60,75}}) + C$$