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### PR Latihan Turun KVT 3

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

b.  $\int \frac{3x^5}{\sqrt{5-9x^6}} dx = \int \frac{3x^5}{\sqrt{t}} \cdot \frac{dt}{-54x^5}$   
 $= \int \frac{1}{-18} \cdot t^{-1/2} dt$   
 $= \frac{2t^{1/2}}{-18} = -\frac{1}{9} \sqrt{5-9x^6}$

c.  $\int \frac{5x-10}{2x^2+x-1} dx = \int \frac{5x-10}{(2x-1)(x+1)} dx = \int \frac{5}{x+1} - \frac{5}{2x-1} dx$   
 $= \int \frac{5}{x+1} dx - \int \frac{5}{2x-1} dx = 5 \ln|x+1| - \frac{5}{2} \ln|2x-1| + C$

d.  $\int_3^9 \frac{x^4-2x^2-10}{x-5} dx = \int_3^9 x^3 + 5x^2 + 23x + 115 + \frac{565}{x-5} dx$   
 $= \int_3^9 x^3 + 5x^2 + 23x + 115 + \int_3^9 \frac{565}{x-5} dx$   
 $= \left[ \frac{1}{4}x^4 + \frac{5}{3}x^3 + \frac{23}{2}x^2 + 115x \right]_3^9 + 565 \ln|x-5| \Big|_3^9$   
 $= \frac{1}{4}9^4 + \frac{5}{3}9^3 + \frac{23}{2}9^2 + 115 \cdot 9 - \left( \frac{1}{4}3^4 + \frac{5}{3}3^3 + \frac{23}{2}3^2 + 115 \cdot 3 \right) + (565 \ln|9-5| - 565 \ln|3-5|)$   
 $= 67 + 106,67 + 189 + 460 - 20,25 - 45 - 103,5 - 345 + 0 - 391,63$   
 $= -90,71$

$$e. \int_2^4 \frac{x^2 - 4x - 5}{x^4 - 2x^3 + 2x - 1} dx = \int_2^4 \frac{1}{(x-1)^2} - \frac{4}{(x-1)^3} dx = \left[ -\frac{1}{x-1} + \frac{2}{(x-1)^2} \right]_2^4$$

$$= \frac{2}{(4-1)^2} - \frac{1}{4-1} - \frac{2}{(2-1)^2} + \frac{1}{2-1} = \frac{2}{9} - \frac{1}{3} - 2 + 1 = -\frac{1}{3} - 1 = -\frac{4}{3}$$

$$2. \frac{x}{x^2 - 1} = \frac{A}{x-1} + \frac{B}{x+1} \Rightarrow -1,33$$

$$\frac{1}{x^2 - 1} = \frac{A}{x-1} + \frac{B}{x+1}$$

$$\frac{1}{(x-1)(x+1)} = \frac{A(x+1)}{(x-1)(x+1)} + \frac{B(x-1)}{(x-1)(x+1)}$$

$$1 = A(x+1) + B(x-1)$$

$$1 = Ax + A + Bx - B$$

$$1 = (A+B)x + (A-B)$$

$$\begin{cases} A+B=0 \\ A-B=1 \end{cases} \Rightarrow \begin{cases} A = -\frac{1}{2} \\ B = \frac{1}{2} \end{cases}$$

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

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

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

$$1 = -\frac{1}{2}x - \frac{1}{2} + \frac{1}{2}x - \frac{1}{2}$$

$$1 = -1$$