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a. $\int_{-1}^{-2} (4t - 6t^2)\, dt$

b. $\int_{1}^{8} (x^{\frac{1}{3}} + x^{\frac{4}{3}})\, dx$

c. $\int_{0}^{4} (2x+1)\sqrt{x+x^2}\, dx$

d. $\int_{-1}^{3} \frac{1}{(t+2)^2}\, dt$

e. $\int_{-1}^{0} 3x^2\sqrt{x^3+1}\, dx$

Jawab:

a. $\int_{-1}^{-2} -4t + 6t^2\, dt$

$\int_{-1}^{-2} -4 + 6t^2\, dt$

$\int_{-1}^{-2} 4t + \int 6t^2\, dt$

$= -2t^2 + \int 6t^2\, dt$

$= -2t^2 + 2t^3$

$[(-2t^2 + 2t^3)]_{-2}^{-1}$

$= -2\cdot(-1)^2 + 2(-1)^3 - (-2\cdot(-2)^2 + 2\cdot(-2)^3)$

$= 20$ //

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(b) $\int_1^8 \left| x^{\frac{1}{3}} + x^{\frac{4}{2}} \right| dx$

$= \left[\frac{3}{4} x^{\frac{4}{3}} + \frac{3}{7} x^{\frac{7}{3}} \right]_1^8$

$X = 8$

$= \frac{3}{4}(8)^{\frac{4}{3}} + \frac{3}{7}(8)^{\frac{7}{3}} = \frac{3}{4}(16) + \frac{3}{7}(128)$

$= \frac{3}{4} \times 16 + \frac{3}{7} \times 128 = 12 + \frac{384}{7} = \frac{84}{7}$

$+ \frac{384}{7} = 468$

$X = 1$

$= \frac{3}{4}(1)^{\frac{4}{3}} + \frac{3}{7}(1)^{\frac{7}{3}} = \frac{3}{7} \times 1 = \frac{3}{4} + \frac{3}{7} = \frac{21}{28}$

$= \frac{21}{28} + \frac{12}{28} = \frac{33}{28}$

$= \frac{468}{7} = \frac{468 \times 4}{28} = \frac{1872}{28} - \frac{33}{28}$

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$= \frac{1872 - 33}{28} = \frac{1839}{28}$

d) $\int_{-1}^{3} \frac{1}{(t-2)^2}\, dt =$

$= \frac{1}{t+2} = -\frac{1}{-1+2} - \left(-\frac{1}{3+2}\right) = -1 - \left(-\frac{1}{5}\right)$

$= -1 + \frac{1}{5} = \frac{-4}{5}$

e) $\int_{-1}^{0} 3x^2\sqrt{x^3+1}\, dx$

$u = x^3 + 1 \quad . \quad \frac{du}{dx} = 3x^2$

$x = -1 \quad u = (-1)^3 + 1 = -1 + 1 = 0$
$x = 0 \quad u = (0)^3 + 1 = 0 + 1 = 1$

$\int_0^1 \sqrt{u}\, du = \int u^{\frac{1}{2}}\, du = \frac{2}{3}u^{\frac{3}{2}} = \left[\frac{2}{3}u^{\frac{3}{2}}\right]_0^1$

$= \frac{2}{3}(1)^{\frac{3}{2}} - \frac{2}{3}(0)^{\frac{3}{2}} = \frac{2}{3} - 0 = \frac{2}{3}$

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$y =$ Sumbu $2x - 1$, Sumbu X ; $x = 2$ dan $x = 3$

$$\int_{-2}^{3} (2x - 1) \, dx$$

$$x^2 - x \Big]_2^3$$

$F(x) = x^2 - x$

$F(3) = 3^2 - 3 = 9 - 3 = 3$

$F(-2) = (-2)^2 - (-2) = 4 + 2 = 6$

$$\int_{-2}^{3} (2x - 1) \, dx$$

$= F(3) - F(-2)$

$= 6 - 6$

$= 0$