Question 1. a) Find the area bounded by the curves $f(x) = \frac{1}{2}x + 3$, $g(x) = -x^2 + 1$, $x = -2$, and $y = 1$. $x = 1$

b) Find $\int_6^7 \frac{\ln(t-5)}{t-5} dt$

c) Evaluate $\int (4x^3 - \frac{1}{4x} + 4) dx$

Answer 1.

(15 puan) b) $$\int_6^7 \frac{\ln(t-5)}{t-5} dt = \int_6^7 u\, du = \frac{1}{2}u^2$$

$$= \frac{1}{2}\left[\ln(t-5)\right]^2 \Big|_6^7$$

$\ln(t-5) = u \qquad du = \frac{1}{t-5} dt$

$$= \frac{1}{2}\left[\ln(2) - \ln 1\right]^2$$

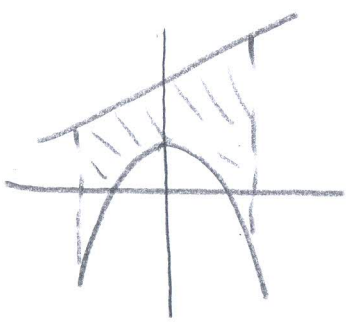
$$= \ln 2 //$$

(15 puan) c) $$\int \left(4x^3 - \frac{1}{4x} + 4\right) dx = \frac{4x^4}{4} - \frac{1}{4}\ln|x| + 4x + C$$

$$= x^4 - \frac{1}{4}\ln|x| + 4x + C$$

İPTAL!!!

a)



$$A = \int_{-2}^{1} [f(x) - g(x)]\, dx = \int_{-2}^{1} \left[\left(\frac{x}{2} + 3\right) - (-x^2 + 1)\right] dx$$

$$= \frac{33}{4}$$

Question 2. Major Motors, Inc., produces the following cars per year: 1000 luxery cars (L), 3000 medium-priced cars (M), and 2000 compact cars (C). The L sells for \$5000 each, M sells for \$3000 each, and C sells for \$2000 each. Find the total amound of money received by the company from the sale of these cars.

b) Let $A = \begin{bmatrix} -1 & 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, $C = \begin{bmatrix} 0 \\ -1 \\ 0 \end{bmatrix}$ be. Show that $A(B+C) = AB + AC$ and $(B+C)^T = B^T + C^T$.

c) Find BA and BC.

Answer 2.

a) $A = \begin{bmatrix} 1000 & 3000 & 2000 \end{bmatrix}$

$B = \begin{bmatrix} 5000 \\ 3000 \\ 2000 \end{bmatrix}$

$A \cdot B = 18.000$

b) $\begin{bmatrix} -1 & 2 & 4 \end{bmatrix}\left(\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + \begin{bmatrix} 0 \\ -1 \\ 0 \end{bmatrix}\right) = \begin{bmatrix} -1 & 2 & 4 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix} = \begin{bmatrix} 1+2+12 \end{bmatrix} = \begin{bmatrix} 13 \end{bmatrix}$

$\begin{bmatrix} -1 & 2 & 4 \end{bmatrix}\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + \begin{bmatrix} -1 & 2 & 4 \end{bmatrix}\begin{bmatrix} 0 \\ -1 \\ 0 \end{bmatrix} = \begin{bmatrix} 15 \end{bmatrix} + \begin{bmatrix} -2 \end{bmatrix} = \begin{bmatrix} 13 \end{bmatrix}$

$(B+C)^T = \begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}^T = \begin{bmatrix} 1 & 1 & 3 \end{bmatrix}$

c) $BA = \begin{bmatrix} -1 & 2 & 4 \\ -2 & 4 & 8 \\ -3 & 6 & 12 \end{bmatrix}$ BC is not defined!

Question 3.

a) Find the inverse of A, where $A = \begin{bmatrix} 3 & -4 \\ 1 & -2 \end{bmatrix}$ by using the classical adjoint of A.

b) Solve the linear system of equations

$$\begin{aligned} 3x_1 - x_2 &= 4 \\ x_1 + 2x_2 &= 1 \end{aligned}$$

using by determinant of coefficient matrix.

Answer 3.

a) $A^{-1} = \frac{1}{\det A} \operatorname{Adj} A$ $\qquad \operatorname{Adj} A = (-1)^{i+j} \det A_{ij} \left(= [c_{ij}] \right)$

$\det A = 3(-2) - (-4)(1) = -6 + 4 = -2 \neq 0$

$\operatorname{Adj} A = \begin{bmatrix} -2 & 4 \\ -1 & 3 \end{bmatrix}$ $\qquad A^{-1} = \frac{1}{-2} \begin{bmatrix} -2 & 4 \\ -1 & 3 \end{bmatrix}$

$= \begin{bmatrix} 1 & -2 \\ 1/2 & -3/2 \end{bmatrix}$

b) $\det A = \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix} = 6 + 1 = 7$

$x_1 = \dfrac{\begin{vmatrix} 4 & -1 \\ 1 & 2 \end{vmatrix}}{7} = \frac{9}{7}$ $\qquad x_2 = \dfrac{\begin{vmatrix} 3 & 4 \\ 1 & 1 \end{vmatrix}}{7} = -\frac{1}{7}$