- **QUESTION 1**

For the matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and the matrix $B = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, find if the expression $3 - B^T AB$ is positive or negative.

- **QUESTION 2**

Calculate the result of the addition

$$\frac{1-i}{1+i} + \frac{2i}{2+3i}$$

where i is the imaginary unit.

- **QUESTION 3**

For the matrix $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and the vector $\vec{b} = \begin{bmatrix} 8 \\ -2 \end{bmatrix}$, find the measure(length) and the angle with respect to the horizontal axis x of the vector $\vec{c} = 5\vec{j} + A\,\vec{b}$.

- **QUESTION 4**

Find the value of θ, when $\sin(8\theta)\cos(4\theta) = 0$

- **QUESTION 5**

Find the value of θ, when $\tan(5 + \theta) = \tan(5)$

- **QUESTION 6**

Find the first derivative of $f(x) = \sin(3x^2) + e^x \cdot 3^{-x}$

- **QUESTION 7**

Find the first derivative of $f(x) = \frac{\sin(3x^2)}{2+\sin(x)}$

- **QUESTION 8**

Find the first derivative of $f(x) = \frac{\tan(3+x^2)}{e^{2x}}$

- **QUESTION 9**

Find the angle between the vectors $\vec{a} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ and $\vec{b} = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}$

- **QUESTION 10**

Find the roots of the equation $\begin{vmatrix} \cos(\theta) & \sin(2\theta) \\ \frac{1}{2} & \cos(\theta) \end{vmatrix} = 0$

- **QUESTION 11**

Calculate the integral $\int_1^2 xln(x^2)dx$

- **QUESTION 12**

Calculate the integral $\int_2^3 x^2 ln(x^3)dx$