

BE- Alg. 2 | WEDNESDAY 4-7-10

ACT ① WHAT is the matrix product

"The
Real
ACT"

$$\begin{bmatrix} a \\ 2a \\ 3a \end{bmatrix} [1, 0, -1]$$

② $\frac{1}{1+i} \cdot \frac{1-i}{1-i} = ?$ where $i = \sqrt{-1}$

① $\begin{bmatrix} a \\ 2a \\ 3a \end{bmatrix} [1, 0, -1] \Rightarrow \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}$

$\begin{bmatrix} a \\ 2a \\ 3a \end{bmatrix} \Rightarrow \begin{bmatrix} a & 0 & -a \\ 2a & 0 & -2a \\ 3a & 0 & -3a \end{bmatrix}$

$(3 \times 1)(1 \times 3) \Rightarrow (3 \times 3)$

② $\frac{1}{1+i} \cdot \frac{1-i}{1-i} = \frac{1-i}{1^2 - i^2} = \frac{1-i}{1-(-1)} = \boxed{\frac{1-i}{2}}$

$i = \sqrt{-1} = i$

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

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21-24, 30-32, 39, 40, 47, 50, 54

$$(21) \quad 8^3 = 512 \quad \therefore \boxed{\log_8 512 = 3}$$

$$(22) \quad 3^3 = 27 \quad \therefore \boxed{\log_3 27 = 3}$$

$$(23) \quad 5^{-3} = \frac{1}{125} \quad \therefore \boxed{\log_5 \left(\frac{1}{125}\right) = -3}$$

$$(24) \quad \left(\frac{1}{3}\right)^{-2} = 9 \quad \therefore \boxed{\log_{\left(\frac{1}{3}\right)} 9 = -2}$$

$$(30) \quad \log_{100} \left(\frac{1}{10}\right) = -\frac{1}{2} \quad \therefore \boxed{100^{-\frac{1}{2}} = \frac{1}{10}} \quad \checkmark$$

$$(31) \quad \log_8 4 = \frac{2}{3} \quad \therefore \boxed{8^{\frac{2}{3}} = 4} \quad \checkmark$$

$$(32) \quad \log_{\left(\frac{1}{5}\right)} 25 = -2 \quad \boxed{\left(\frac{1}{5}\right)^{-2} = 25} \quad \checkmark$$

$$(39) \quad \log_5 5^7 = \boxed{7}$$

$$(40) \quad 2^{\log_2 45} = \boxed{45}$$

$$(47) \log_9 X = 2$$

$$9^2 = X \quad \therefore \boxed{X = 81}$$

$$\underline{\text{CK}} \quad \log_9 81 = 2 \quad \checkmark$$

$$(50) \log_{25} N = \frac{3}{2}$$

$$25^{\frac{3}{2}} = N \quad \therefore (\sqrt{25})^3 = 5^3 = \boxed{125 = N}$$

$$\underline{\text{CK}} \quad \log_{25} 125 = \frac{3}{2}$$

$$25^{\frac{3}{2}} = 125 \quad \checkmark$$

$$(54) \log_{10} (X^2 + 1) = 1$$

$$10^1 = X^2 + 1$$

$$9 = X^2$$

$$\boxed{\pm 3 = X}$$

$$\underline{\text{CK}} \quad \log_{10} (3^2 + 1) = 1$$

+3

$$\log_{10} 10 = 1$$

$$\therefore 10^1 = 10 \quad \checkmark$$

$$\underline{\text{CK}} \quad \log_{10} ((-3)^2 + 1) = 1 \quad \checkmark$$

-3