BE - Alg. 2 | Wednesday 4-6-11

ACT ① What is the matrix product

"The Real Act"

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

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

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①

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

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

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

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

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

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

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

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

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

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

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

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

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

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

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

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

(47.) $\log_9 X = 2$

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

Ck $\log_9 81 \stackrel{?}{=} 2$ ✓

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

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

Ck $\log_{25} 125 \stackrel{?}{=} \frac{3}{2}$

$25^{\frac{3}{2}} \stackrel{?}{=} 125$ ✓

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

$10^1 = X^2 + 1$

$9 = X^2$

$\boxed{\pm 3 = X}$

Ck +3 $\log_{10}(3^2+1) \stackrel{?}{=} 1$

$\log_{10} 10 \stackrel{?}{=} 1 \quad \therefore 10^1 \stackrel{?}{=} 10$ ✓

Ck −3 $\log_{10}(-3)^2+1) \stackrel{?}{=} 1$ ✓