

Math 1613 - Trigonometry

Quiz #25 - 2011.11.15

Solutions

1. Simplify i^{2011} .

Remember that $i^4 = 1$, so first note that $2011 = 4 \cdot 502 + 3$, so $i^{2011} = (i^4)^{502} \cdot i^3 = -i$.

2. Show that the following three vectors are mutually perpendicular:

$$\vec{u} = \langle 1, 0, -1 \rangle, \quad \vec{v} = \langle 0, 1, 1 \rangle, \quad \vec{w} = \langle 1, -1, 1 \rangle$$

All we have to do is compute $\vec{u} \cdot \vec{v}$, $\vec{u} \cdot \vec{w}$ and $\vec{v} \cdot \vec{w}$. These three simple dot products give

$$\vec{u} \cdot \vec{w} = \vec{v} \cdot \vec{w} = 0.$$

However,

$$\vec{u} \cdot \vec{v} = -1 \neq 0$$

thus the vectors are not perpendicular!