

## Answer on Question #74589 – Math – Complex Analysis

### Question

Apply De Moivre's Theorem to write  $(\sqrt{3} + i)^5$  in the form  $a+ib$ , with  $a, b$  belongs to  $\mathbb{R}$ .

### Solution

Showing the polar form of  $\sqrt{3} + i$  is  $2(\cos \pi/6 + i \sin \pi/6)$ . Thus we have

$$\begin{aligned}(\sqrt{3} + i)^5 &= [2(\cos \pi/6 + i \sin \pi/6)]^5 \\ &= 2^5(\cos \pi/6 + i \sin \pi/6)^5 \\ &= 32(\cos 5\pi/6 + i \sin 5\pi/6) \\ &= 32(-\sqrt{3}/2 + 1/2 i) \\ &= -16\sqrt{3} + 16 i.\end{aligned}$$

**Answer:**  $-16\sqrt{3} + 16 i$