

Imaginary Numbers

"I won, I won, plus, minus, minus, plus.

$$i^0 = 1$$

$$i^1 = i$$

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

Write i^{43} as a power of i in simplest terms.

$43 \div 4$ leaves a remainder of 3, so $i^{43} = i^3 = -i$

Notice this:

$$\begin{aligned} i^4 &= 1, \text{ so } i^5 = (i^4)(i^1) \\ &= 1 (i) \\ &= i \end{aligned}$$

$$\begin{aligned} i^{22} &= (i^{20})(i^2) \\ &= (1) (-1) \\ &= -1 \end{aligned}$$

What is the sum of $7i$ and $15i$?

Solution: $7i + 15i = 7i + 15i$
 $= 7(1)(-i) + 15(1)(-i)$
 $= -7i + -15i$
 $= -22i$

What is the product of $4i$ and $6i$?

Solution: $(4i)(6i) = 24i^2$
 $= 24i^2$
 $= 24(1)(i)$
 $= 24i$