

Notes # 5 Powers of i

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

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

$$i \cdot i = i^2$$

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

PAIR

$$i \cdot i \cdot i = i^3$$

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

Pair

$$i \cdot i \cdot i \cdot i = i^4$$

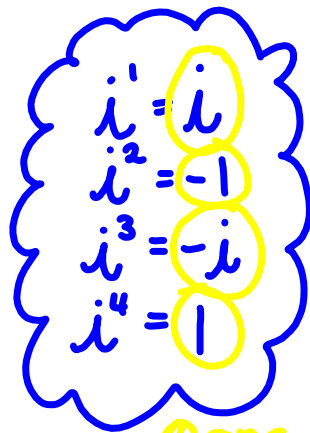
$$\sqrt{-1} \cdot \sqrt{-1} \cdot \sqrt{-1} \cdot \sqrt{-1} = \sqrt{\boxed{-1 \cdot -1} \cdot \boxed{-1 \cdot -1}} = \boxed{-1} \cdot \boxed{-1} = \boxed{1}$$

Ex 1.

$$i^{10}$$

Since there is a Pattern
There are $\textcircled{4}$ answer possibilities

We will \div the exponent by $\textcircled{4}$



Answers

$$4 \overline{) 10} \begin{array}{r} 2 \\ -8 \\ \hline \end{array}$$

i^2 remainder is my new exponent to get the ANSWER

$$\textcircled{-1}$$

Ex 2.

$$i^{27}$$

$$4 \overline{) 27} \begin{array}{r} 6 \\ -24 \\ \hline \end{array}$$

$$i^3$$

$$\textcircled{-i}$$

always $\div 4$
b/c there are $\textcircled{4}$ answer options

try this:

$$i^{18}$$

$$4 \overline{) 18} \begin{array}{r} 4 \\ -16 \\ \hline \end{array} i^2 = \textcircled{-1}$$