

9. Complete the table, given that $i = \sqrt{-1}$ and $i^2 = -1$.

i	$= i^1 = i$
$i \times i$	$= i^2 = -1$
$i \times (i \times i)$	$= i^3 = -i$
$(i \times i) \times (i \times i)$	$= i^4 = (-1) \times (-1) = 1$
$(i \times i \times i \times i) \times i$	$= i^5 = i$
$(i \times i \times i \times i) \times (i \times i)$	$= i^6 = -1$

Describe the pattern formed from this sequence.

What strategy could be used to simplify $i^n, n \in \mathbb{N}$? [e.g., i^{29} and i^{32} .]

Pattern



$$i^{29} = i^{28} \cdot i = (i^4)^7 \cdot i = i$$

$$i^{43} = -i$$

$$i^{26} = -1$$

$$i^{102} = -1$$



10. Simplify each of the following:

(i) $i^{30} = 1$ (ii) $i^{11} = -i$ (iii) $i^{19} = -i$ (iv) $i^{21} = i$ (v) i^{-4}

$$i^{-4} = \frac{1}{i^4} = \frac{1}{1} = 1$$

$$i^{-3} = \frac{1}{i^3} = \frac{1}{-i}$$