$\boxed{\text{Powers of } i}$

Notice a pattern?

$i^0 = 1$

$i^1 = \boxed{i}$

$i^2 = \boxed{-1}$

$i^3 = \boxed{-i}$

$i^4 = i^3 \cdot i$
$= -i \cdot i$
$= -i^2$
$= -(-1)$
$\boxed{1}$

$i^5 = i^4 \cdot i$
$= 1 \cdot i = \boxed{i}$

$i^6 = i^5 \cdot i = i \cdot i = i^2$
$= \boxed{-1}$

$i^7 = i^6 \cdot i = -1 \cdot i$
$= \boxed{-i}$

$i^8 = i^7 \cdot i = -i \cdot i$
$= \boxed{1}$

$i^9 = \boxed{i}$

$i^{10} = \boxed{-1}$

$i^{11} = \boxed{-i}$

$i^{12} = \boxed{1}$

So, how would you find i^{35}?

$35 \div 4 = 8$, 32, remainder 3

remainder

$i^3 = \boxed{-i}$

Now find i^{99}.

so write pattern

$i^0 = 1$
$i^1 = i$
$i^2 = -1$
$i^3 = -i$

then see where i^{99} is in pattern.

$99 \div 4 = 24$: 8, 19, 16, 3 ← remainder

$i^3 = \boxed{-i}$

What would i^{20} be? $20 \div 4 = 5$: 20, 0 ← remainder

so $i^0 = \boxed{1}$

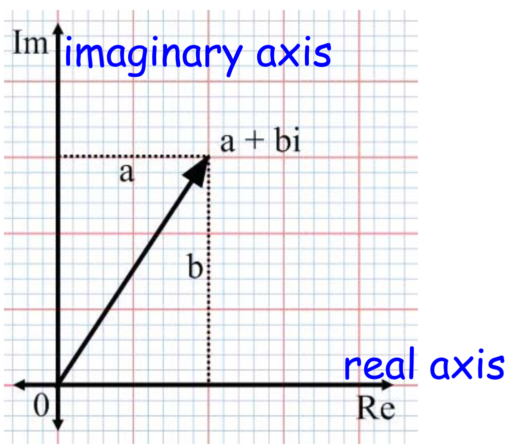
what about i^{21}? $21 \div 4 = 5$: 20, 1

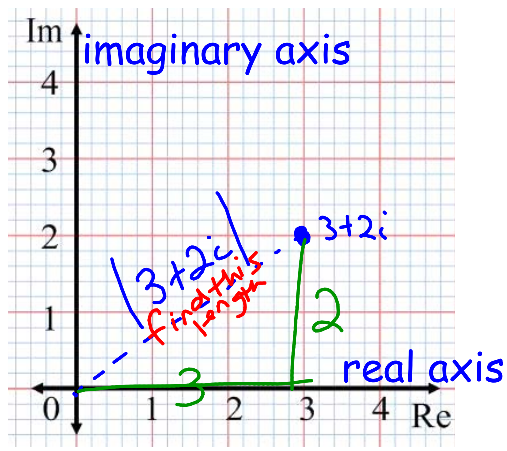
$i^1 = \boxed{i}$

Geometrical Representation of Complex Numbers

A complex number a + bi is represented in the Complex Number Plane as:

EX.





1. Plot the complex number 3 + 2i on the Complex Number Plane.

2. Find the absolute value (magnitude) of complex number 3 + 2i

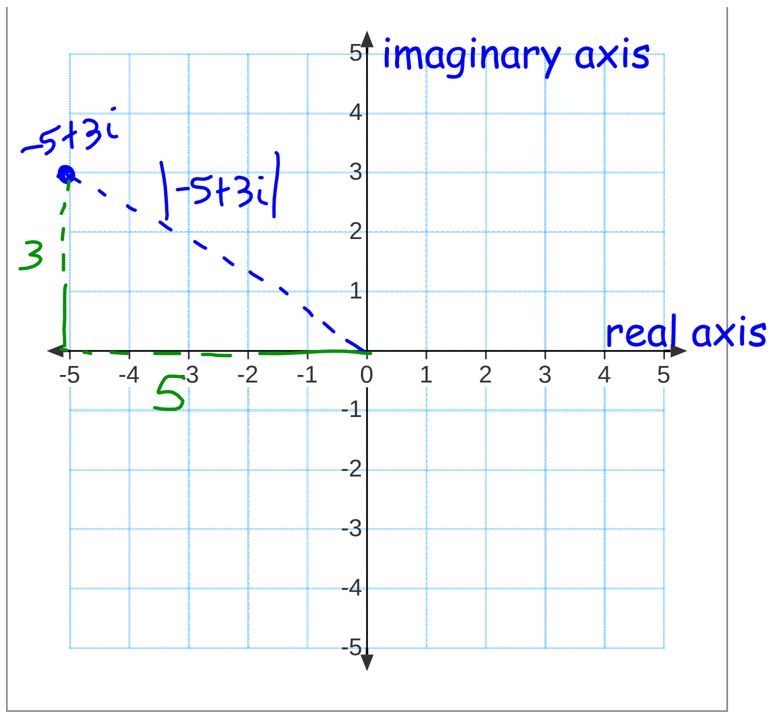
so $|3+2i| = \sqrt{13}$

Use pythag thrm $a^2+b^2=c^2$ so $c=\sqrt{a^2+b^2}$

$= \sqrt{3^2+2^2}$

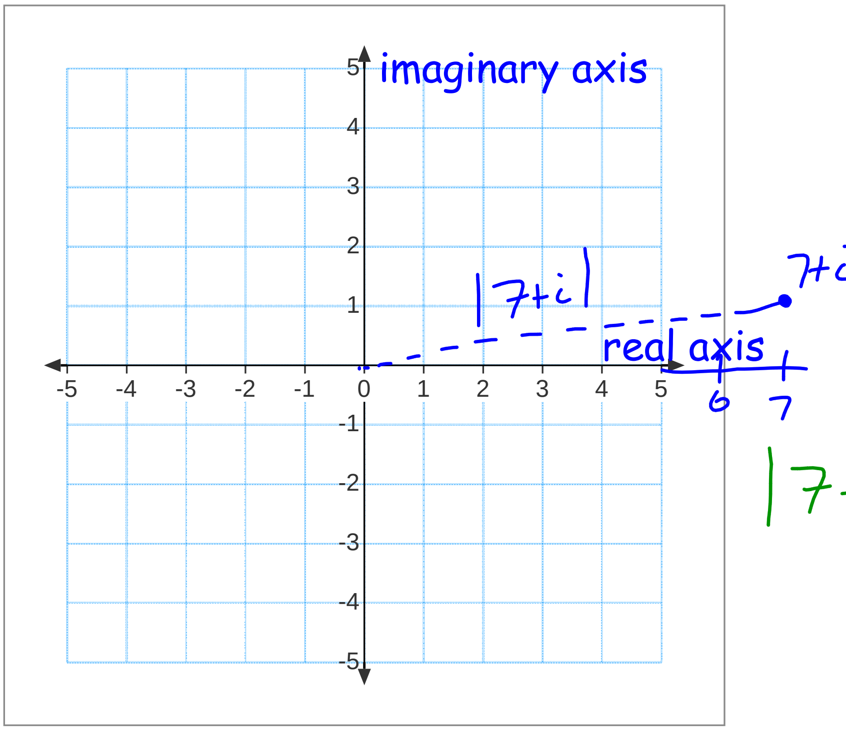
$= \sqrt{9+4}$

$= \boxed{\sqrt{13}}$



$$|-5+3i| = \sqrt{(5)^2 + (3)^2}$$
$$= \sqrt{25+9}$$
$$= \sqrt{34}$$

1. Plot the complex number -5 + 3i
and find its absolute value(MAGNITUDE).



$$|7+i| = \sqrt{(7)^2+(1)^2}$$
$$= \sqrt{49+1}$$
$$= \sqrt{50}$$
$$= \sqrt{25}\cdot\sqrt{2}$$
$$\boxed{= 5\sqrt{2}}$$

2. Plot the complex number 7+ i
and find its absolute value(MAGNITUDE).