## complex Numbers

## Introduction to Complex Numbers

* The imaginary number, $i$, is defined as the number whose $\qquad$ is -1 .

$$
\begin{aligned}
& i^{2}= \\
& i= \\
& \hline
\end{aligned}
$$

$\qquad$ and $\qquad$ numbers together make up the set of $\qquad$ numbers.

* A complex number is any number of the form $\qquad$ (or $\qquad$ ), where $a$ and $b$ are $\qquad$ numbers.


Simplifying Radicals Involving Complex \#s

| Product Property of Square Roots | Imaginary Roots |
| :---: | :---: |
| $\sqrt{a b}=\sqrt{a} \cdot \sqrt{b}$ | For any non-negative real number, $\sqrt{-x}=i \sqrt{x}$ |

For \#s 1-8, simplify the radical.

1) $\sqrt{-2}$
2) $2 \sqrt{-8}$
3) $2 \sqrt{-48}$
4) $4 \sqrt{-50}$
5) $\sqrt{-98}$
6) $-3 \sqrt{-24}$
7) $\sqrt{-9}$
8) $\sqrt{-32}$

## Powers of $\mathbf{i}$

| By hand, Divide the EXPONENT OF $\boldsymbol{i}^{\boldsymbol{n}}$ by 4. The <br> result is: | If divided in the calculator, your decimal <br> value is |  |  |
| :--- | :--- | :--- | :--- |
| $i^{1}=$ | If the remainder is ... | 0 | No decimal |
| $i^{2}=$ | If the remainder is ... | 1 | .25 |
| $i^{3}=$ | If the remainder is ... | 2 | .5 |
| $i^{4}=$ | If the remainder is ... | 3 | .75 |

## For \#s 9-12, Simplify.

9) $i^{26}=$
10) $i^{44}=$
11) $i^{29}$
12) $i^{79}=$

| Operations with Complex Numbers |  |  |
| :---: | :---: | :---: |
|  |  | $(-3+4 i)+(-3+i)$ |
|  | Q O E ® | $(4-5 i)-(5+8 i)$ |
|  | ¢ | $(-2+4 i)(-1+3 i)$ |
|  | ¢ | $(-3+i) \div(4-3 i)$ |

