Complex Numbers

Limitations of the Real Number System - can't take the square root (or any even root) of a negative number

Define the imaginary number $i = \sqrt{-1}$

$\sqrt{-4} =$ $\sqrt{-100} =$ $-\sqrt{-144} =$

Complex Numbers are numbers of the form $a + bi$
where a and b are real numbers

Addition and Subtraction of Complex Numbers:

$(-2 + 6i) + (3 + 2i)$ $(9 + i) - (3 + 2i)$

If $i = \sqrt{-1}$, then $i^2 = ??$

Multiplication of Complex Numbers:

$(5i)(-3i)$

$5i(-6+2i)$

$(7-2i)(3+i)$

$(3-2i)^2$

$(7+2i)(7-2i)$

Division of Complex Numbers:

You must use the CONJUGATE to rationalize the denominator

$$\frac{29}{5+2i}$$

$$\frac{-8-2i}{7+3i}$$

$$(4+3i)^{-1}$$

Powers of i:

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

$i^2 = -1$

$i^1 =$

$i^2 =$

$i^3 =$

$i^4 =$

$i^{26} =$

$i^{37} =$

$i^{-17} =$

$i^8 - i^7 =$

Miscellaneous Problems:

$\sqrt{-3} \cdot \sqrt{-7} =$

$\sqrt{-25} \cdot \sqrt{-1} =$

$\frac{\sqrt{-8}}{\sqrt{2}} =$

$\frac{\sqrt{-28}}{\sqrt{-7}} =$

$$\frac{12}{\sqrt{-3}} =$$