

The imaginary unit i can be used to write the square root of any negative number.

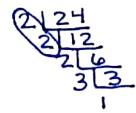
$i = \sqrt{-1}$ AND $i^2 = -1$

If r is a positive real number, then

$\sqrt{-r} = i\sqrt{r}$

① $\sqrt{-3} = i\sqrt{3}$ ③ $(i\sqrt{5})^2 = i^2 \cdot 5 = -5$

② $\sqrt{-24} = i\sqrt{24} = 2i\sqrt{6}$

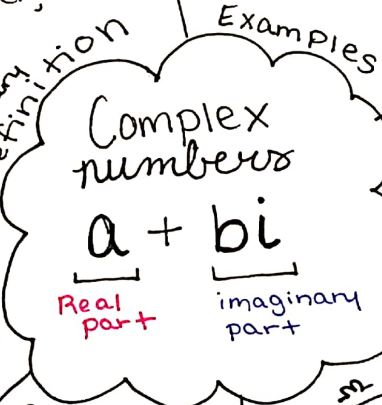


$(8-i)(5+4i)$
 $8+5 \quad -i+4i$ Add Separately
 $13+3i$

ms. Blue

HOW TO: Add/Subtract their real parts and their imaginary parts separately

$(7-6i) - (3-6i)$
 $7-3 \quad -(6-(-6i))$
 $4+0i$ OR 4



ADDING

Examples

SUBTRACTING

EXAMPLES

MULTIPLYING
 multiply using the distributive property. $(9-2i)(-4+7i)$
 $-36 + 63i + 8i - 14i^2$
 $-36 + 71i - 14(-1)$
 $-36 + 71i + 14$
 $= -22 + 71i$

DIVIDING
 To divide, multiply top & bottom on the complex conjugate of denom.
 $\frac{7+5i}{1-4i} = \frac{(7+5i) \cdot (1+4i)}{(1-4i) \cdot (1+4i)} = \frac{7+28i+5i+20i^2}{1+4i-4i-16i^2}$
 Simplify = $\frac{-13+33i}{17} = \frac{-13}{17} + \frac{33i}{17}$

∴ ✕

OFTEN when solving a QUADRATIC equation, the solution will contain an imaginary number.

example:
 $5x^2 + 33 = 3$
 $5x^2 = -30$
 $x^2 = -6$
 $\sqrt{x^2} = \sqrt{-6}$
 $x = \pm\sqrt{-6}$
 $x = \pm i\sqrt{6}$

Look for negatives INSIDE Square roots! $\sqrt{-\#}$

When multiplied, complex conjugates will always be a REAL #

WHEN WILL I SEE THESE ???

imaginary Definition

COMPLEX CONJUGATES

$a+bi$ and $a-bi$