

Mon 11-12-18

Section 1.5 Complex Numbers

Solve by using the quadratic formula

ex  $x^2 + 6x + 10 = 0$

$a=1$   $b=6$   $c=10$

$$\frac{-6 \pm \sqrt{(6)^2 - 4(1)(10)}}{2(1)}$$

$$\frac{-6 \pm \sqrt{36 - 40}}{2}$$

$$\frac{-6 \pm \sqrt{-4}}{2}$$

$$\frac{-6 \pm \sqrt{4} \cdot \sqrt{-1}}{2}$$

$$\frac{-6 \pm 2\sqrt{-1}}{2}$$

$$\frac{-6 \pm 2i}{2}$$

$$-3 \pm i$$

$x = -3 + i$   
 $x = -3 - i$

definitions

$$j = \sqrt{-1}$$

$$j^2 = -1$$

Complex numbers in standard form -  $a + bi$  where  $a + b$  are real #s

ex  $7 + 4i$ ,  $a=7$   $b=4$   
 ↓ real ↓ imaginary

ex  $3 - i$ ,  $a=3$   $b=-1$

ex  $5$ ,  $a=5$   $b=0$   
 $5 + 0i$

Adding and Subtracting Complex #s

\* Treat "i" as a variable

ex  $(7 + 3i) + (4 - 2i)$   
 $7 + 4 + 3i - 2i = 11 + i$

ex  $(7 + 3i) - (4 - 2i)$   
 $7 + 3i - 4 + 2i = 3 + 5i$

Multiplying Complex #s

ex  $2i(4 + 3i) = 8i + 6i^2 = 8i + 6(-1) = 8i - 6$

ex  $(2 + 3i)(4 - 5i) = 8 - 10i + 12i - 15i^2 = 8 + 2i - 15(-1)$   
 $= 8 + 2i + 15$   
 $= 2i + 23$

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

$$4 - 6i + 6i - 9i^2$$

$$4 - 9i^2$$

$$4 - 9(-1) = 4 + 9 = 13$$