

Complex Numbers

Note Title

5/21/2009

15. Solve $5x^2 + 2x + 6 = 0$

$$\text{Solve } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\begin{aligned} a &= 5 \\ b &= 2 \\ c &= 6 \end{aligned}$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(5)(6)}}{2(5)}$$

$$x = \frac{-2 \pm \sqrt{4 - 120}}{10}$$

$$x = \frac{-2 \pm \sqrt{-116}}{10}$$

- TO MAKE ROOTS WITH EQUATIONS WITH NEGATIVE

DISCRIMINANTS, WE CREATED $\sqrt{-1} = i$

$$\underline{\underline{OR}} \quad i^2 = -1$$

$$x = \frac{-2 \pm \sqrt{-16}}{10}$$

$$x = \frac{-2 \pm \sqrt{-1} \cdot \sqrt{16}}{10}$$

$$x = \frac{-2 \pm i \sqrt{16}}{10}$$

$$x = \frac{-2 \pm i \sqrt{4} \sqrt{29}}{10}$$

$$x = \frac{-2 \pm 2i\sqrt{29}}{10}$$

$$x = \frac{-1 \pm i\sqrt{29}}{5}$$

$$x = \frac{-1}{5} \pm \frac{i\sqrt{29}}{5}$$

REAL PART IMAGINARY PART

- WORKING WITH i

$$\text{IS } (2 + 3i) + (6 - 5i) = 8 - 2i$$

$$\text{IS } (2 + 3i)(4 + 6i) = 8 + 12i + 12i + 18i^2$$

$$= 8 + 24i + 18i^2$$
$$= 8 + 24i + 18(-1)$$

$$= -10 + 24i$$

$$\text{The } i^6 = (i^2)^3 \quad i^8 = (i^2)^4$$

$$= (-1)^3 = (-1)^4$$

$$= -1 = 1$$

$$\sqrt{-5} = \sqrt{-1} \sqrt{5}$$

↓

$$i \sqrt{5}$$
$$\sqrt{-13} =$$

$$\begin{aligned} x^2 + 1 &= 0 \\ x^2 + 1 &= 0 \\ x^2 + 1 &= 0 \end{aligned}$$

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$$x^2 + 1 = 0$$

$$x^2 + 1 = 0$$

?

$$x =$$

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

$$x =$$

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

$$x^2 = -1$$

$$x^2 = -1$$

$$x^2 = -1$$

$$\frac{-6 \pm \sqrt{6^2 - 4(2)(5)}}{2(2)}$$