

August 28, 2015
 Completing the Square

$$5x^2 + 2x + 9 = 0$$

* Isolate variable terms
 $5x^2 + 2x = -9$
 * Coefficient of x^2 must be a "one"

$$\frac{5x^2}{5} + \frac{2x}{5} = \frac{-9}{5}$$

* $x^2 + \frac{2}{5}x = -\frac{9}{5}$
 a) $\frac{2}{5} \cdot \frac{1}{2} = \frac{1}{5}$
 b) $(\frac{1}{5})^2 = \frac{1}{25}$ *add to both sides*

$$x^2 + \frac{2}{5}x + \frac{1}{25} = -\frac{9}{5} + \frac{1}{25}$$

Perfect Square Trinomial

$$(x + \frac{1}{5})^2 = -\frac{44}{25}$$

Use Square Root Property

$$\sqrt{(x + \frac{1}{5})^2} = \pm \sqrt{-\frac{44}{25}}$$

$$x + \frac{1}{5} = \pm i \frac{\sqrt{44}}{5}$$

$$= \pm i \frac{2\sqrt{11}}{5}$$

$$x = -\frac{1}{5} \pm \frac{i2\sqrt{11}}{5}$$

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$$\frac{\frac{1}{3} - \frac{10}{3}}{\frac{2}{1} + \frac{1}{3}} = \frac{\frac{1-9}{3}}{\frac{6+1}{3}}$$

$$= \frac{-\frac{10}{3} \text{ K}}{\frac{7}{3} \text{ F}}$$

$$= -\frac{10}{3} \cdot \frac{3}{7} = -\frac{10}{7}$$

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$$x = -\frac{1}{5} + \frac{i2\sqrt{11}}{5}$$

$$5x^2 + 2x + 9 = 0$$

$$5\left(-\frac{1}{5} + \frac{i2\sqrt{11}}{5}\right)^2 + 2\left(-\frac{1}{5} + \frac{i2\sqrt{11}}{5}\right) + 9 = 0$$

$$5\left(\frac{-1 + i2\sqrt{11}}{5}\right)\left(\frac{-1 + i2\sqrt{11}}{5}\right) - \frac{2 + i4\sqrt{11}}{5} + 9 = 0$$

$$5\left(\frac{1 - i2\sqrt{11} - i2\sqrt{11} - 44}{25}\right) - \frac{2 + i4\sqrt{11}}{5} + 9 = 0$$

$$\frac{-43 - 4i\sqrt{11}}{5} - \frac{2 + i4\sqrt{11}}{5} + 9 = 0$$

$$\frac{-43 - 4i\sqrt{11} - 2 - i4\sqrt{11}}{5} + 9 = 0$$

$$-\frac{45}{5} + 9 = 0$$

$$-9 + 9 = 0$$

$$0 = 0 \checkmark$$

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$$(i2\sqrt{11})(i2\sqrt{11})$$

$$(i \cdot i \cdot 2 \cdot 2 \cdot \sqrt{11} \cdot \sqrt{11})$$

$$i^2 \cdot 4 \cdot 11$$

$$-1 \cdot 44$$

$$(-2i\sqrt{11}) + (-2i\sqrt{11})$$

$$-2i + (-2i) \cdot \sqrt{11}$$

$$-4i\sqrt{11}$$

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