

$$x = -2 \pm i\sqrt{3}$$

9. $3x^2 - 8x + 4 = 0$

$$x^2 - 8x + 12 = 0$$

$$(x - \frac{2}{3})(x - \frac{6}{3}) = 0$$

$$(3x - 2)(x - 2) = 0$$

$$x = \frac{2}{3} \quad x = 2$$

$$3x^2 - 8x = -4$$

$$3(x^2 - \frac{8}{3}x + \frac{4}{3}) = -4 + 3 \cdot \frac{4}{3}$$

$$\frac{8}{3} \cdot \frac{1}{2} = (\frac{8}{6})^2 = \frac{64}{36}$$

$$3(x - \frac{4}{3})^2 = \frac{4}{3}$$

$$(x - \frac{4}{3})^2 = \frac{4}{9}$$

$$x - \frac{4}{3} = \pm \frac{2}{3}$$

$$x = \frac{4}{3} \pm \frac{2}{3}$$

$$x = \frac{4}{3} + \frac{2}{3} = 2 \quad x = \frac{4}{3} - \frac{2}{3} = \frac{2}{3}$$

10. $3x^2 - 2x - 5 = 0$

$$x^2 - 2x - 5 = 0$$

$$(x - \frac{5}{3})(x + \frac{3}{3}) = 0$$

$$(3x - 5)(x + 1) = 0$$

$$x = \frac{5}{3} \quad x = -1$$

$$3x^2 - 2x = 5$$

$$3(x^2 - \frac{2}{3}x + \frac{4}{36}) = 5 + 3 \cdot \frac{4}{36}$$

$$3(x - \frac{1}{3})^2 = \frac{16}{3}$$

$$\sqrt{(x - \frac{1}{3})^2} = \sqrt{\frac{16}{9}}$$

$$x - \frac{1}{3} = \pm \frac{4}{3}$$

$$x = \frac{1}{3} \pm \frac{4}{3}$$

$$x = \frac{1}{3} + \frac{4}{3} = \frac{5}{3} \quad x = \frac{1}{3} - \frac{4}{3} = -1$$

11. $2x^2 - 2x - 5 = 0$

Can't factor

$$2x^2 - 2x = 5$$

$$2(x^2 - x + \frac{5}{4}) = 5 + 2 \cdot \frac{5}{4}$$

$$2(x - \frac{1}{2})^2 = \frac{11}{2}$$

$$\sqrt{(x - \frac{1}{2})^2} = \sqrt{\frac{11}{4}}$$

$$x - \frac{1}{2} = \pm \sqrt{\frac{11}{4}}$$

$$x = \frac{1}{2} \pm \sqrt{\frac{11}{4}}$$

$$x = \frac{1}{2} + \sqrt{\frac{11}{4}}$$

$$x = \frac{1}{2} - \sqrt{\frac{11}{4}}$$

12. $10x^2 + 4x + 68 = 0$

Can't factor

$$10x^2 + 4x = -68$$

$$10(x^2 + \frac{4}{10}x + \frac{16}{400}) = -68 + 10 \cdot \frac{16}{400}$$

$$(\frac{4}{20})^2 = \frac{16}{400}$$

$$10(x + \frac{4}{20})^2 = \frac{-338}{5}$$

$$\sqrt{(x + \frac{4}{20})^2} = \sqrt{\frac{-338}{50}}$$

$$x + \frac{4}{20} = \pm i \sqrt{\frac{338}{50}}$$

$$x = -\frac{4}{20} \pm i \sqrt{\frac{338}{50}}$$

$$x = -\frac{1}{5} \pm i \sqrt{\frac{169}{25}}$$