

(1)[5 points] Solve for  $x$ :

$$x^2 - 42 = -11x$$

$$x^2 + 11x - 42 = 0$$

$$(x+14)(x-3) = 0$$

$$x+14 = 0, \quad x-3 = 0$$

$$\boxed{x = -14, \quad x = 3}$$

(2)[5 points] Solve for  $x$ :

$$\frac{4}{3}x + 1 = \frac{1}{3} - \frac{1}{3}x - x^2$$

$$x^2 + \frac{4}{3}x + \frac{1}{3}x + 1 - \frac{1}{3} = 0$$

$$x^2 + \frac{5}{3}x + \frac{2}{3} = 0$$

$$3x^2 + 5x + 2 = 0$$

$$\therefore a = 3, b = 5, c = 2$$

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

$$= \frac{-5 \pm \sqrt{5^2 - 4(3)(2)}}{2(3)}$$

$$= \frac{-5 \pm 1}{6}$$

$$x = \frac{-5+1}{6}, \quad x = \frac{-5-1}{6}$$

$$x = \frac{-4}{6}, \quad x = \frac{-6}{6}$$

$$\boxed{x = -\frac{2}{3}, \quad x = -1}$$

(3)[5 points] solve for  $x$ :

$$5x^2 - 8x = -13$$

$$5x^2 - 8x + 13 = 0$$

$$a = 5, b = -8, c = 13$$

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

$$= \frac{-(-8) \pm \sqrt{(-8)^2 - 4(5)(13)}}{2(5)}$$

$$= \frac{8 \pm \sqrt{64 - 260}}{10}$$

$$= \frac{8 \pm \sqrt{-196}}{10} \rightarrow \text{NO REAL ROOTS!}$$