

$$\textcircled{1} \quad x^2 - 4x + 1 = 0 \rightarrow x^2 - 4x = -1 \quad x^2 - 4x + 4 = -1 + 4$$

$$(x-2)^2 = 3 \Rightarrow x-2 = \pm\sqrt{3}$$

$$\Rightarrow x = 2 + \sqrt{3}, x = 2 - \sqrt{3} \quad \checkmark$$

$$\textcircled{2} \quad x^2 + 11x + 17 = 0 \quad x^2 + 11x = -17 \quad x^2 + 11x + 14 = -17 + 14$$

$$(x+7)^2 = -3 \Rightarrow x+7 = \pm\sqrt{-3}$$

$$\Rightarrow x = -7 + i\sqrt{3}, x = -7 - i\sqrt{3} \quad \checkmark$$

$$\textcircled{1} \quad x^2 - 2x + 4 = 0 \rightarrow x^2 - 2x + 4 = (x-1)^2 + 3 = 0 \Rightarrow (x-1)^2 = -3$$

$$\Rightarrow x-1 = \pm i\sqrt{3} \Rightarrow x = 1 + i\sqrt{3}, x = 1 - i\sqrt{3} \quad \checkmark$$

$$\textcircled{2} \quad x^2 - 2x - 12 = 0 \rightarrow x^2 - 2x - 12 = (x+2)(x-6) = 0$$

$$\Rightarrow x = -2, x = 6 \quad \checkmark$$

$$\textcircled{1} \quad x^2 - 3x - 2 = 0 \quad \Delta = (-3)^2 - 4(1)(-2) = 17$$

$$x = \frac{3 \pm \sqrt{17}}{2} \Rightarrow x = \frac{3 + \sqrt{17}}{2}, x = \frac{3 - \sqrt{17}}{2} \quad \checkmark$$

$$\textcircled{2} \quad 4x^2 - 5x + \frac{1}{4} = 0 \quad \Delta = (-5)^2 - 4(4)(\frac{1}{4}) = 17$$

$$x = \frac{5 \pm \sqrt{17}}{8} \Rightarrow x = \frac{5 + \sqrt{17}}{8}, x = \frac{5 - \sqrt{17}}{8} \quad \checkmark$$

$$\textcircled{1} \quad x^2 - 3x + 2 = 0 \rightarrow x^2 - 3x + 2 = (x-1)(x-2) = 0$$

$$\Rightarrow x = 1, x = 2 \quad \checkmark$$

$$\textcircled{2} \quad 4x^2 + x - 3 = 0 \rightarrow (4x-3)(x+1) = 0$$

$$\Rightarrow x = \frac{3}{4}, x = -1 \quad \checkmark$$

$$\textcircled{2} \quad x^2 - 12x + 35 = 0 \rightarrow x^2 - 12x + 35 = (x-5)(x-7) = 0$$

$$\Rightarrow x = 5, x = 7 \quad \checkmark$$

$$\textcircled{1} \quad 3x^2 - 10x + 7 = 0 \rightarrow x^2 - 10x + 21 = 0 \rightarrow (x-3)(x-7) = 0$$

$$\Rightarrow x = 3, x = 7 \quad \checkmark$$

$$1 - 3x^2 + 2x - 1 = 0 \quad \Delta = 2^2 - 4(-3)(-1) = 1^2 \quad \Delta > 0 \quad \checkmark$$

$$1 - 3x^2 - x + 2 = 0 \quad \Delta = (-1)^2 - 4(-3)(2) = -1^2 \quad \Delta < 0 \quad \checkmark$$

۱. ریشه حقیقی دارد

$$3 - 3x^2 - 4x + 2 = 0 \quad \Delta = (-4)^2 - 4(-3)(2) = 0 \quad \Delta = 0 \quad \checkmark$$

۲. فاقد ریشه حقیقی

$$1 - 3x^2 - x + 1 = 0 \quad \Delta = (-1)^2 - 4(-3)(1) = -1^2 \quad \Delta < 0 \quad \checkmark$$

۳. یک ریشه حقیقی دارد

$$3x^2 - 3x + a = 0 \quad A = 3 \quad B = -3 \quad C = a \quad \Delta = (-3)^2 - 4(3)(a) =$$

۴. (و ریشه حقیقی)

$$\Delta > 0 \rightarrow 9 - 12a > 0 \quad 9 > 12a \Rightarrow a < \frac{3}{4}$$

۵. یک ریشه حقیقی

$$\Delta = 0 \rightarrow 9 - 12a = 0 \quad 9 = 12a \Rightarrow a = \frac{3}{4}$$

۶. هیچ ریشه حقیقی

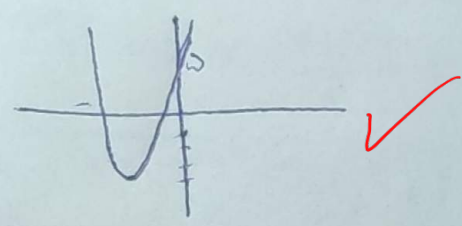
$$\Delta < 0 \rightarrow 9 - 12a < 0 \quad 9 < 12a \Rightarrow a > \frac{3}{4}$$

۷. هیچ ریشه حقیقی

$$\Delta \geq 0 \rightarrow 9 - 12a \geq 0 \quad a \leq \frac{3}{4} \quad \checkmark$$

$$1. \quad y = x^2 + 4x + 2 \quad x = -\frac{b}{2a} = -\frac{4}{2} = -2 \quad y = (-2)^2 + 4(-2) + 2 = -\frac{1}{2}$$

۲. $a = 1 > 0$ $\checkmark$ min

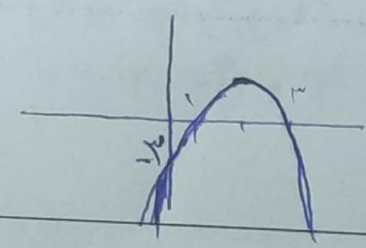


$$y = -x^2 + 4x - 3 \quad x = -\frac{b}{2a} = -\frac{4}{-2} = 2 \quad y = (-2)^2 + 4(2) - 3 = 1 \quad \checkmark$$

۳. $a < 0$ max (مأکسم)

$$x-1 - x^2 + 4x - 3 = x^2 - 4x + 2 \rightarrow (x-1)(x-3) = 0 \Rightarrow x=1, x=3$$

۴. $(1,0), (3,0) \rightarrow$ دایره نقطه
نقطه تقاطع می کند



$$x^2 - 3x - 2 = 0$$

$$S = -\frac{b}{a} \rightarrow -\frac{-3}{1} = 3 \quad S^2 - 2P = 9 - 2(-2) = 1^2 \quad \checkmark$$

$$P = \frac{c}{a} = \frac{-2}{1} = -2 \quad S^2 - 3SP = 9 - 3(3)(-2) = 27 \quad \checkmark$$