

الف) $x^2 - 4x = -1 \Rightarrow \frac{4}{2} = 2$
 $x^2 - 4x + 4 = -1 + 4$
 $(x - 2)^2 = 1$
 $x - 2 = \pm 1$
 $x_1 = 3$
 $x_2 = 1$ ✓

ب) $x^2 + 11x - 7 = 7 \frac{1}{2} = \frac{15}{2}$
 $x^2 + 11x + 12 = 15 + 12$
 $(x + 4)^2 = 9$
 $x + 4 = \pm 3$
 $x + 4 = -3 \Rightarrow x_1 = -7$
 $x + 4 = 3 \Rightarrow x_2 = -1$ ✓

نیم علی بن ابی طالب اسم خیره تللیف اسم
 منظر لحاظ محاسن!

(2)

الف) $x^2 - 4x + 4 = 0$
 $(x - 2)(x - 2) = 0$
 $x = 2$ ✓

ب) $x^2 - 5x - 12 = 0$
 $(x - 7)(x + 2) = 0$
 $x = 7$
 $x = -2$ ✓

(2)

الف) $x^2 - 3x - 4 = 0$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{3 \pm \sqrt{9 + 16}}{2} = \frac{3 \pm 5}{2}$
 $x_1 = \frac{3 + 5}{2} = 4$
 $x_2 = \frac{3 - 5}{2} = -1$ ✓

ب) $2x^2 - 4x + \frac{1}{2} = 0$
 $b^2 - 4ac = (-2)^2 - 4 \times 2 \times \frac{1}{2} = 0$
 $x = \frac{4 \pm \sqrt{0}}{4} = \frac{4}{4} = 1$
 $x_1 = 1$
 $x_2 = 1$ ✓

(2)

الف) $x^2 - 3x + 2 = 0$
 $(x - 1)(x - 2) = 0$
 $x = 1$
 $x = 2$ ✓

ب) $4x^2 + x - 3 = 0$
 $4x^2 + 4x - 3x - 3 = 0$
 $4x(x + 1) - 3(x + 1) = 0$
 $(4x - 3)(x + 1) = 0$
 $4x - 3 = 0 \Rightarrow x = \frac{3}{4}$
 $x + 1 = 0 \Rightarrow x = -1$

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

(2)

الف) $ax^2 - 12x + 9 = 0$
 $x^2 - 12x + 4 = 0$
 $(x - 6)(x - 2) = 0$
 $x_1 = \frac{6}{2} = 3$
 $x_2 = \frac{4}{2} = 2$ ✓

ب) $3x^2 - 10x + 7 = 0$
 $x^2 - 10x + 7 = 0$
 $(x - 7)(x - 1) = 0$
 $x_1 = \frac{7}{3}$
 $x_2 = \frac{7}{3} = 1$ ✓

(2)

$$1) -2x^2 + 5x - 1 = 0$$

$$\Delta = 5^2 - 4 \times 2 \times (-1) = 25 - (-8) = 33$$

$$33 > 0 \Rightarrow \text{اثنين حقيقيين}$$

$$2) 2x^2 - x + 2 = 0$$

$$\Delta = (-1)^2 - 4 \times 2 \times 2 = 1 - 16 = -15$$

$$-15 < 0 \Rightarrow \text{لا حقيقيين}$$

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

$$\Delta = (-5)^2 - 4 \times 2 \times 2 = 25 - 16 = 9$$

$$\Delta = 9 > 0 \Rightarrow \text{اثنين حقيقيين}$$

$$4) 2x^2 - x + 1 = 0$$

$$\Delta = (-1)^2 - 4 \times 2 \times 1 = 1 - 8 = -7$$

$$-7 < 0 \Rightarrow \text{لا حقيقيين}$$

$$2x^2 - 2x + a = 0$$

$$\Delta = (-2)^2 - 4 \times 2 \times a$$

$$\Delta = 4 - 8a$$

$$1) \Delta > 0 \Rightarrow 4 - 8a > 0 \Rightarrow a < \frac{1}{2}$$

$$2) \Delta = 0 \Rightarrow 4 - 8a = 0 \Rightarrow -8a = -4 \Rightarrow a = \frac{1}{2}$$

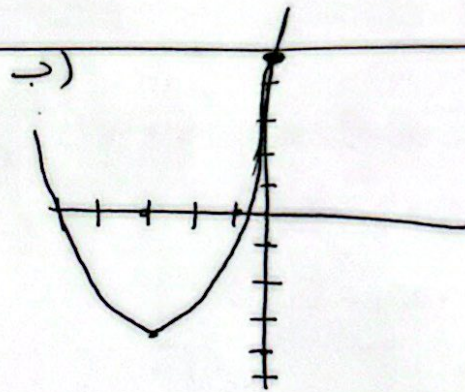
$$3) \Delta < 0 \Rightarrow 4 - 8a < 0 \Rightarrow a > \frac{1}{2}$$

$$4) \Delta \geq 0 \Rightarrow 4 - 8a \geq 0 \Rightarrow a \leq \frac{1}{2}$$

$$y = \frac{1}{9}x^2 + \frac{4}{9}x + a$$

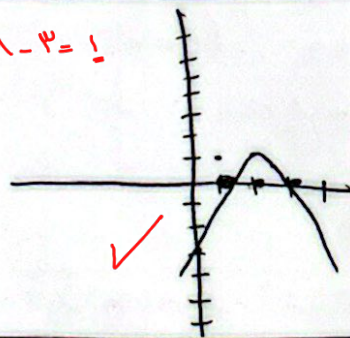
$$\min \left| \begin{array}{c} -\frac{b}{2a} = -\frac{4}{2} = -2 \\ -f \end{array} \right|$$

$$\min \left| \begin{array}{c} -2 \\ -f \end{array} \right|$$



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

$$\max \left| \begin{array}{c} -\frac{b}{2a} = -\frac{1/2}{-1/2} = 1 \\ 1 \end{array} \right|$$



$$1) \left| \begin{array}{c} 1 \\ 0 \end{array} \right| > \left| \begin{array}{c} 3 \\ 0 \end{array} \right|$$

$$-x^2 + 4x - 3 = 0$$

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

$$x = 1, 3$$

$$x^2 - 2x - 2$$

$$S = -\frac{b}{a}, P = \frac{c}{a}$$

$$S = -\frac{-2}{1} = +2$$

$$P = \frac{-2}{1} = -2$$

$$1) S^2 - 4P = 4 - (-8) = 12$$

$$2) S^2 - 4SP = 4 - 2 \times 2 \times (-2) = 4 + 8 = 12$$