Subject:
Year. Month. Date. ( ) Name.

$$\begin{cases} \frac{-b}{2a} = -1 \\ \frac{-\Delta}{4a} = +9 \end{cases} \qquad \frac{-b}{2a} = -1 \Rightarrow b = 2a \quad (1)$$

$$\frac{-b^2 + 4ac}{4a} = +9$$

$$-4a^2 + 4ac = 36a \longrightarrow c - a = 9$$

$$c = a + 9$$

$$(3, 1) \Rightarrow 9a + 6a + 9 + a = 1$$

$$a = -\frac{1}{2} \qquad b = -1 \qquad c = 8.5$$

$$y = -\frac{1}{2}x^2 - x + 8.5$$

$$S = \frac{-b}{a} > 0 \qquad \frac{-m}{2} > 0 \Rightarrow m < 0 \quad \text{I} \quad (2)$$

$$P = \frac{c}{a} > 0 \qquad \frac{m+6}{2} > 0 \Rightarrow m > -6 \quad \text{II}$$

$$\Delta = b^2 - 4ac > 0 \qquad m^2 + 8m - 48 > 0$$

$$(m - 12)(m + 4) > 0$$

$$m > 12 \text{ or } m < -4 \quad \text{III}$$

$$\text{I, II, III} \Rightarrow \boxed{-6 < m < -4} \qquad m \in (-6, -4)$$

$$S = \frac{1}{P} \qquad \frac{1 - 2m}{3} = \frac{3}{2 - m} \quad (3)$$

$$2m^2 - 5m - 7 = 0 \qquad m = -1 \;/\; \frac{7}{2}$$

$m = -1$ ✗ (does not satisfy the condition)

$\boxed{m = \frac{7}{2}}$ ✓

TOPCO

Subject:
Year. Month. Date. ( ) Name.

$x^2 - x - 4 = 0 \quad S = 1 \quad P = -4$ (۴)

$x_1^2 + x_2^2 + \frac{x_1 + x_2}{x_1 x_2} = S^2 - 2SP + \frac{S}{P} = \frac{101}{4}$

$x_1^3 + x_2^3 + x_1^2 + x_2^2 + \frac{1}{x_1 x_2} = \frac{-221}{4}$

مخرج مشترک $\Rightarrow 4x^2 - 101x - 221 = 0$

$x^2 - \frac{101}{4}x - \frac{221}{4} = 0$

(۵)

$\left(\sqrt[3]{x^2} + \frac{1}{\sqrt[3]{x^2}} + 1\right)\left(\sqrt[3]{x^2} - 1\right) =$

$\frac{x^2 - 1}{\sqrt[3]{x^2}} = 4\sqrt[3]{x} \rightsquigarrow x^2 - 1 = 4x$

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

$x_1 + x_2 = \frac{-b}{a} \Rightarrow -\frac{-4}{1} = 4$

(۶)

$\alpha + \frac{\alpha}{2} = \frac{6}{2}$

$\alpha = \pm 2$

$\alpha = 2 \quad 12 - 2a + 4 \quad a = 8$

$a = -2 \quad 12 + 2a + 4 \quad a = -8$ $\Big\} \Rightarrow 16$

(۷)

$a > 0 \quad \frac{3 + 2a}{a} < 0$ I

$3 + 2a < 0 \rightsquigarrow a < -\frac{3}{2}$ II

$I \cap II = \emptyset$

Subject:

Year. Month. Date. ( ) Name.

$\frac{2}{-1} = \frac{-\alpha}{1}$ $\alpha = 2$ (۸)

$y = x^2 + 2x - 2 \leq 1$ $\rightsquigarrow$ $x^2 + 2x - 2 = 0$

$x = -1 / -3$

$y = -x^2 - 2x + 4$ $b = 4$ $4\alpha 20^\circ$

$\alpha = \alpha' + \frac{1}{2}$ (۹)

$2(\alpha' + \frac{1}{2})^2 - a(\alpha' + \frac{1}{2}) + b =$

$2ax^2 + ax - 6$

$2\alpha'^2 + (2-a)\alpha' + \frac{1}{2} - \frac{a}{2} + b = 2ax^2 + ax - 6$

$\left[\frac{ab}{4}\right] = \frac{-6}{4} = -2$ $a = 1$

$b = -6$

$x^2 + 6x + m = x^2 + 2x - 3m$ (۱۰)

$4x = -4m$ $x = -m$

$x^2 - 6x + m = x^2 - 3m = 0$

$x(x - 3) = 0$

$x = 0$ or 3

$x^2 + 6x + 3 = 0$ $x^2 + 2x - 15 = 0$

$x \leq \frac{-1}{3}$ $x < \frac{-5}{1}$

$2 \cdot 1 = 4$