

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

$$\frac{5x + 2}{5x^2}$$

$$\alpha + \beta = 5$$

$$\alpha \beta = 2$$

$$\beta^2 = 5\beta - 2 \rightarrow \beta^2 = 5(5 - \beta) - 2$$

$$5\beta - 2 = \beta^2$$

$$\beta^2 = 5(5 - \beta) - 2 = 25 - 5\beta - 2$$

$$\alpha = 5 - \beta \rightarrow 5\alpha = 25 - 5\beta$$

$$\frac{5\alpha\beta^2}{5\beta^2} = \frac{5\alpha}{5} = 5$$

$$5\alpha + \beta^2 = (5 - \beta) + (25 - 5\beta - 2)$$

$$= 5 - \beta + 25 - 5\beta - 2$$

$$= 28 - 6\beta$$

$$(2, -1) \rightarrow \text{مرفض نیست}$$

$$x = \frac{2 + (-1)}{1} = 1 \rightarrow \boxed{1}$$

$$x^2 + 2kx + 1 = 0$$

$$\frac{\sqrt{\Delta}}{|a|} = \sqrt{(2k)^2 - 4}$$

$$= \frac{2}{1} k$$

$$\left[\frac{k^2}{1} \right] = \left[\frac{4}{1} \right] = 4$$

$$4k^2 - 4 = \frac{16}{9} k^2 \rightarrow 36k^2 - 36 = 16k^2 \rightarrow 20k^2 = 36 \rightarrow k^2 = \frac{9}{5} \rightarrow k = \frac{3}{\sqrt{5}}$$

$$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$$

$$(\alpha + \beta)^2 - 2\alpha\beta = 4 \rightarrow 4 - 2\alpha\beta = 4 \rightarrow \alpha\beta = -1$$

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

$$\alpha + \beta = -2$$

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

$$\Delta \geq 0$$

$$-\frac{9}{4} - m \geq 0 \rightarrow -m \geq \frac{9}{4} \rightarrow m \leq -\frac{9}{4} \rightarrow m \leq -2.25$$

$$\Delta = (-5)^2 - 4(1)(-m) = 25 + 4m \rightarrow 25 + 4m \geq 0 \rightarrow m \geq -\frac{25}{4} \rightarrow m \geq -6.25$$

$$f(x) = x^2 - 5x - m$$

$$f\left(\frac{5}{2}\right) = \left(\frac{5}{2}\right)^2 - 5\left(\frac{5}{2}\right) - m = \frac{25}{4} - \frac{25}{2} - m = -\frac{25}{4} - m$$

$$-6.25 \leq m \leq -2.25 \rightarrow \boxed{-6, -5, -4, -3}$$

$y = mx^r - 1rx + am - 1$ $m > 0$ $x = -\frac{b}{ra} \rightarrow \begin{cases} a = m \\ b = -1r \end{cases} \rightarrow x = \frac{1r}{rm} = \frac{r}{m}$	$\Delta = (-r)^r - r(a)(-r) = 9 + 4r = 4r + 9$ $\sqrt{4r+9} = 2\sqrt{r+2.25}$ $m = \frac{r+2.25}{1} \rightarrow \begin{cases} m = -1r \\ m = r+2.25 \end{cases}$ $m > 0 \rightarrow m = r$ $x = \frac{r}{m} = \frac{r}{r} = 1$ $y_{min} = f(x) \rightarrow y = m\left(\frac{r}{m}\right)^r - 1r\left(\frac{r}{m}\right) + am - 1 = -\frac{r^r}{m} + am - 1 \xrightarrow{m=r} -\frac{r^r}{r} + ar - 1 = 0$	6
$x^r + r(a+1)x + ra - 1 = 0$ $\begin{cases} a^r = \alpha\beta \\ \alpha\beta = ra - 1 \end{cases} \rightarrow \begin{cases} a^r = ra - 1 \\ a^r - ra + 1 = 0 \\ (a-1)^r = 0 \\ a = 1 \end{cases}$		7
$x^r - vx^r - a = 0 \xrightarrow{t=x^r} t^r - vt - a = 0 \rightarrow P' = -a < 0$ $\begin{cases} x^r = t_1 > 0 \Rightarrow x_{1,r} = \pm \sqrt[r]{t_1} \\ x^r = t_2 < 0 \Rightarrow x \notin \mathbb{R} \end{cases} \Rightarrow \begin{cases} x_1 + x_r = 0 \\ P = x_1 x_r = \sqrt{t_1} \times (-\sqrt{t_1}) = -t_1 \rightarrow P^r = t_1 \end{cases}$ $t^r - vt - a = 0 \xrightarrow{\sqrt[r]{\frac{4a^2+4a}{r^2}}} t = \frac{v \pm \sqrt{r^2 + 4a}}{r} = \frac{v \pm \sqrt{r^2 + 4a}}{r} \rightarrow t_1 = \frac{v + \sqrt{r^2 + 4a}}{r} \rightarrow P^r = \frac{a^2 + v\sqrt{r^2 + 4a}}{r}$ $rP^r - r^2SP + rS = a^2 + v\sqrt{r^2 + 4a} - 0 + 0 = a^2 + v\sqrt{r^2 + 4a}$		8
$y = kx^r - rx - s$ $y = -rx - s$ $x_r = -\frac{b}{ra} \xrightarrow{\begin{smallmatrix} a=k \\ b=-r \end{smallmatrix}} x_r = -\frac{(-r)}{rk} = \frac{r}{rk} = \frac{1}{k}$ $y_r = k\left(\frac{r}{k}\right)^r - r\left(\frac{r}{k}\right) - s = k\frac{r^r}{k^r} - \frac{r^2}{k} - s = \frac{r^r}{k} - \frac{r^2}{k} - s = \boxed{\frac{r^r}{k} - s}$	$-\frac{r}{k} - s = -\frac{r}{k} \rightarrow \frac{r}{k} - s = -s$ $\frac{r}{k} = r \rightarrow k = 1$ $x_r = \frac{r}{1} = 1$ $y_r = -r(1) - s = \boxed{-1-s}$ $y_r = -rx_r - s = -r\left(\frac{r}{k}\right) - s = \boxed{\frac{r^2}{k} - s}$	9
$y = -mx^r + mx + 1$ $y = -m - x$ $-mx^r + mx + 1 = -m - x$ $-mx^r + mx + 1 + m + x = 0$ $-mx^r + (m+1)x + (m+1) = 0$	$\Delta < 0 \rightarrow \Delta = b^r - rac = (m+1)^r - r(-m)(m+1)$ $a = -m$ $b = m+1$ $c = m+1$ $= (m+1)(am+1)$ $(m+1)(am+1) < 0$ $m = -1 \quad m = -\frac{1}{a}$ $-1 < m < -\frac{1}{a} \rightarrow \boxed{0}$	10