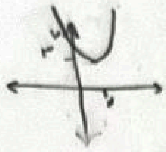
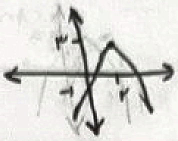
۱

$y = x^2 - 4x + 7 \quad \Big| \; \frac{-b}{2a} = \frac{4}{2} = 2 \; , \; 4 - 8 + 7 = 3$



$y = -x^2 + 4x - 1 \quad \Big| \; \frac{-b}{2a} = \frac{-4}{-2} = 2 \; , \; -4 + 8 - 1 = 3$



۲)

$2x^2 + (m+1)x + \frac{1}{2}m + 2 = 0$

الف) $\Delta > 0 \to (m+1)^2 - 4\underbrace{(2)(\frac{1}{2}m+2)}_{m+4} \geq 0 \to m^2 + 1 + 2m - 4m - 16 \geq 0$

$m^2 - 2m - 15 \geq 0 \to (m-5)(m+3) \geq 0$ $\quad \begin{array}{c|c|c} & -3 & 5 \\ + & - & + \end{array} \to m \in (-\infty, -3) \cup (5, +\infty)$

ب) $\Delta = 0 \to (m+1)^2 - 4(2)(\frac{1}{2}m+2) = 0 \to m^2 - 2m - 15 = 0 \to (m-5)(m+3) = 0$

$m = 5 \,, \; m = -3$

ج) $\Delta < 0 \to (m+1)^2 - 4(2)(\frac{1}{2}m+2) < 0 \to m^2 - 2m - 15 < 0 \to \begin{array}{c|c|c} & -3 & 5 \\ + & - & + \end{array}$ $\boxed{m \in (-3, 5)}$

د) $\Delta \geq 0 \to (m+1)^2 - 4(2)(\frac{1}{2}m+2) \geq 0 \to m^2 - 2m - 15 \geq 0 \to (m-5)(m+3)$

$\begin{array}{c|c|c} & -3 & 5 \\ + & - & + \end{array} \to m \in (-\infty, -3] \cup [5, +\infty)$

۳)

$y = (m-2)x^2 - 2(m+1)x + 10$

الف)

$\Delta \geq 0 \to (-2m-2)^2 - 4(10)(m-2) \to 4m^2 + 4 + 8m - 40m + 80 \geq 0$

$4m^2 - 32m + 84 \geq 0 \quad m^2 - 8m + 21 \geq 0 \to \Delta < 0$

$S < 0 \to \frac{2m+2}{m-2} < 0 \quad \begin{array}{c|c|c} & -1 & 2 \\ + & - & + \end{array} \quad (-1, 2)$

$\xrightarrow{\cap} \emptyset$

$P > 0 \quad \frac{10}{m-2} > 0 \quad \begin{array}{c|c} & 2 \\ - & + \end{array} \to m > 2$

فرزانه شوشتری

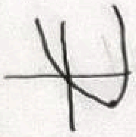
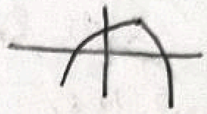
ب)

$\frac{c}{a}=\frac{10}{m-2}<0$ $\quad \frac{\quad 2 \quad}{-\ |\ +} \to m<2$

$\frac{2m+2}{m-2}<0$ $\quad \frac{-1 \quad 2}{+\ |\ -\ |\ +} \to -1<m<2$ $\quad \xrightarrow{\cap} -1<m<2$

۴)

$y=(m-2)x^2-2(m+1)x+10$


$(m-2)x^2-2(m+1)x+10$


۱,۲۵

$\Delta>0 \to 4(m+1)^2-4(10)(m-2)>0$ ✓ $\qquad \Delta>0$ ✓

$a>0 \quad m-2>0 \quad m>2$ $\qquad \xrightarrow{\cap} \varnothing$ $\qquad a<0 \quad m-2<0 \quad m<2$

$c<0 \quad \frac{10}{m-2}<0 \quad \frac{\quad 2 \quad}{-\ |\ +} \to m<2$ $\qquad c<0 \quad \frac{10}{m-2}<0 \quad m<2 \quad \xrightarrow{\cap} \boxed{m<2}$

ب) $\frac{-b}{2a}=-2 \to m=1$

۵)

$\Delta\geq0 \to 4\sin^2\alpha-4(\frac{2}{3})(\frac{3}{2})\geq0 \quad 4\sin^2\alpha-4\geq0 \to 4\sin^2\alpha\geq4 \to \sin^2\alpha\geq1$

$\sin^2\geq1 \to \sin^2\alpha=1 \quad \sin\alpha=\pm1$

$\frac{2}{3}x^2+2x+\frac{3}{2}=0 \quad 4x^2+12x+9=0 \quad (2x+3)^2=0 \quad x=-\frac{3}{2}$ ✗

$2x^2-2x+\frac{3}{2}=0 \to 4x^2-12x+9=0 \quad (2x-3)^2=0 \quad x=\frac{3}{2}$ ✓

۲

۶)

$y=\frac{(3x^2-2x-1)(2x^2-3x-5)}{1-x^2}=\frac{(x+\frac{1}{3})\cancel{(x-1)}\cancel{(x+1)}(x-\frac{5}{2})}{\cancel{(1-x)}\cancel{(1+x)}} \to y=x^2-\frac{13}{6}x-\frac{5}{6}$

$x\neq1 , x\neq-1$

$ax^2+bx+c \to a+b+c=0 \to x=\frac{c}{a}, 1 \qquad ax^2+bx+c \to a+c=b \to x=-\frac{c}{a}, -1$

$y=6x^2-13x-5$

۱,۷۵

$\frac{-\Delta}{4a}=-\frac{b^2-4ac}{4a}=+\frac{289}{24}$

مهرزاد شوشتری

۷)

$۳s = ۵p + ۷ \to ۳\left(\frac{m+۲}{m}\right) = ۵\left(\frac{-۲}{m}\right) + ۷ \to \frac{۳m+۶}{m} = \frac{-۱۰}{m} + ۷$

$\frac{۳m+۶+۱۰-۷m}{m} = ۰ \to -۴m+۱۶=۰ \to -۴m=-۱۶ \to \boxed{m=۴}$

۱٫۲۵

$s^۲ - ۲p = \frac{۱۳}{۴}$

۸)

$\frac{۴\alpha+\beta^۵}{۵\beta^۲} = \frac{۴\alpha}{۵\beta^۲} + \frac{\beta^۳}{۵} \to \frac{۴\alpha}{۵\left(\frac{۲}{\alpha}\right)} + \frac{\beta^۳}{۵} = \frac{\alpha^۳+\beta^۳}{۵} = \frac{s^۳-۳ps}{۵} = \frac{۹۵}{۵} = ۱۹$

$s=۵ \quad p=۲$

۲

۹)

$y = ax^۲+bx+۴ \xrightarrow{x=۲} ۴a+۲b+۴=۱۴ \to ۴a+۲b=۱۰ \to ۲a+b=۵$

$\xrightarrow{x=-۳} ۹a-۳b+۴=۴ \to ۹a-۳b=۰ \to ۳a-b=۰$

$۵a=۵ \quad \boxed{a=۱} \quad \boxed{b=۳}$

$y = x^۲+۳x+۴ \to \frac{-b}{۲a} = \boxed{\frac{-۳}{۲}}$

۲

۱۰)

$y = ۲x^۲+(m+۱)x+m+۶ \;,\; x=y \to ۲x^۲+(m+۱)x+m+۶ = x \to$

$۲x^۲+mx+m+۶=۰ \to m^۲-۴(۲)(m+۶)=۰ \quad m^۲-۸m-۴۸=۰ \quad (m-۱۲)(m+۴)$

$m=۱۲ \;,\; m=-۴$

۱٫۵