

$$-2 \leq \frac{3a+2}{\omega} \leq 2 \rightarrow -10 \leq 3a+2 \leq 20 \rightarrow -12 \leq 3a \leq 18$$

$$\rightarrow -4 \leq a \leq 6 \Rightarrow D: [-4, 6]$$

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$$-2 \leq a \leq 3 \rightarrow -6 \leq 3a \leq 9 \rightarrow -8 \leq 3a-2 \leq 7$$

$$\Rightarrow D_{f(a)} = [-8, 7]$$

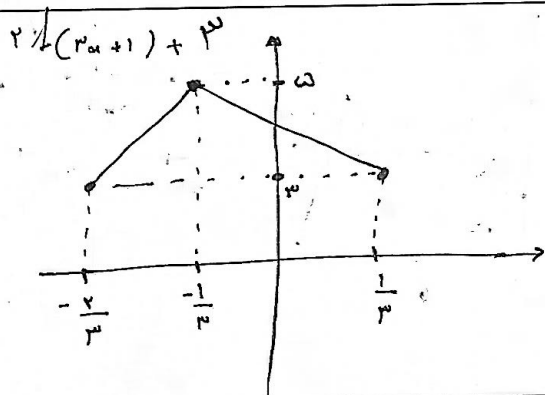
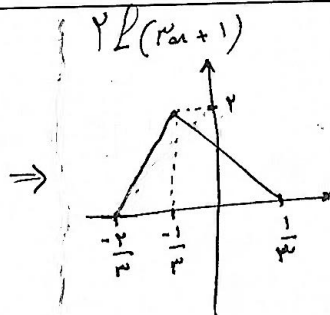
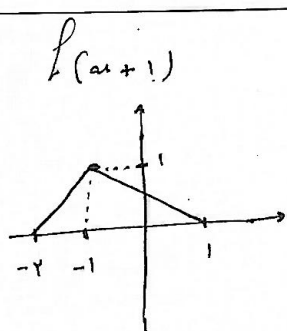
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$$-1 \leq a \leq 3 \rightarrow -3 \leq 3a \leq 9 \rightarrow -2 \leq 3a+1 \leq 10 \rightarrow -1 \leq \frac{3a+1}{2} \leq \omega$$

$$\Rightarrow D_{f(a)}: [-1, \omega) \rightarrow -1 \leq 2-\omega a \leq \omega \rightarrow -3 \leq -\omega a \leq 3$$

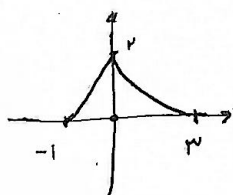
$$\rightarrow -\frac{3}{\omega} \leq -a \leq \frac{3}{\omega} \rightarrow \frac{3}{\omega} \geq a \geq -\frac{3}{\omega} \Rightarrow D_{f(2-\omega a)} = \left(-\frac{3}{\omega}, \frac{3}{\omega}\right]$$

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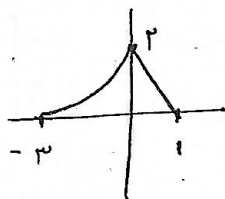


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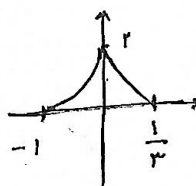
$f(a+2)$



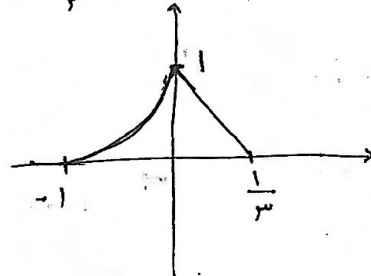
$f(-a+2)$



$f(-3a+2)$



$\frac{1}{2}f(-3a+2)$



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$$u_1 = \frac{-b}{r_1} = \frac{-\frac{r}{\omega}}{-\frac{r}{\omega}} = \frac{r}{\omega} \quad , \quad J_1 = \frac{r_1}{r_2} \Rightarrow J = -\frac{1}{r} \left(u - \frac{r}{\omega} \right)^2 + \frac{r_1}{r_2}$$

← با $\frac{1}{\omega}$ برابر است، $\frac{r_1}{r_2}$ به بالا برود تا آنسوی نقطه $(\frac{r}{\omega}, \frac{r_1}{r_2})$ شود.

$$\Rightarrow J = -\frac{1}{r} \left(\left(u - \frac{1}{\omega} \right) - \frac{r}{\omega} \right)^2 + \frac{r_1}{r_2} + \frac{r_1}{r_2} \Rightarrow J = -\frac{1}{r} (u - \frac{r}{\omega})^2 + \frac{r_1}{r_2}$$

$$\Rightarrow J = 0 \rightarrow -\frac{1}{r} (u - \frac{r}{\omega})^2 + \frac{r_1}{r_2} = 0 \Rightarrow (u - \frac{r}{\omega})^2 = \frac{r_1}{r_2} \Rightarrow u - \frac{r}{\omega} = \pm \sqrt{\frac{r_1}{r_2}} \Rightarrow u = \frac{r}{\omega} \pm \sqrt{\frac{r_1}{r_2}} \Rightarrow u = 1, \sqrt{r_1}$$

$f(m) \text{ در } : u_1 = 1, J_1 = \frac{r_1}{r_2} \Rightarrow r_1 u + r = 1 \rightarrow r_1 u = -1 \rightarrow u = -\frac{1}{r_1}$

$$\Rightarrow 1 - r_1 \left(\frac{1}{r_1} \right) = 1 - r_1 \times \frac{1}{r_1} = -1$$

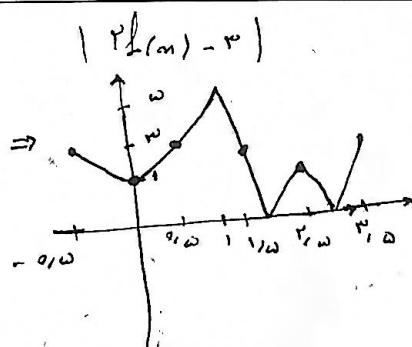
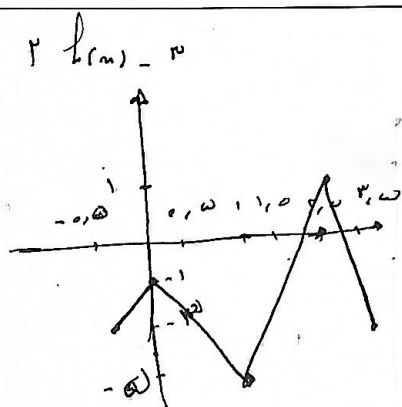
$$\rightarrow A \left(-\frac{1}{r_1}, -1 \right) \Rightarrow \alpha \beta, -\frac{1}{r_1} \times -1 = \frac{1}{r_1}$$

$$D_f = (a, \varepsilon] \rightarrow a < u-1 \leq \varepsilon \rightarrow a+1 < u \leq \omega \Rightarrow D_g = (-r, \omega)$$

$$D_g = [-1, b) \rightarrow -1 \leq u+1 < b \rightarrow -r \leq u < b-1$$

$$\Rightarrow b-1 = \omega \rightarrow b = \omega + 1, \quad a+1 = -r \rightarrow a = -r-1$$

$$\Rightarrow a-b = -r-1-\omega = -9$$



$$D_{g_r} = [-1, \omega, r, \omega]$$

$$R_{g_r} = [0, \sqrt{r}]$$

$$g(m) = \left| \frac{(u-r)+1}{r(u-r)+1} \right| + 1 \Rightarrow g(m) = \left| \frac{u-1}{r(u-r)} \right| + 1$$

$$u + g(m) < 0 \Rightarrow g(m) < -u$$

$$\frac{u-1}{r(u-r)} + 1 = -u \Rightarrow \frac{u-1}{r(u-r)} = -u-1 \Rightarrow u = \pm \sqrt{r}$$

$$\frac{u-1}{r(u-r)} < 0 \Rightarrow u = -\sqrt{r} \Rightarrow \text{جواب: } (-\infty, -\sqrt{r})$$

