

$$f\left(\frac{cx+y}{\omega}\right), \quad -2 \leq \frac{3x+y}{\omega} \leq 4 \Rightarrow -1 \leq \frac{3x+y}{\omega} \leq 2 \Rightarrow -1 \leq \frac{3x}{\omega} \leq 1 \Rightarrow -\frac{\omega}{3} \leq x \leq \frac{\omega}{3}$$

(2) -1

$$D_f = [-\frac{\omega}{3}, \frac{\omega}{3}]$$

$$-2 \leq x \leq 3 \Rightarrow -4 \leq 3x \leq 9 \Rightarrow -1 \leq 3x-2 \leq 7 \Rightarrow D_f = [-1, 7]$$

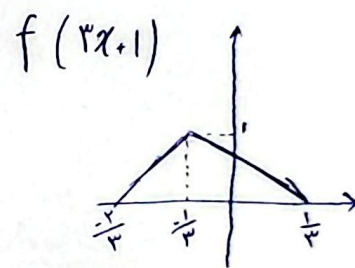
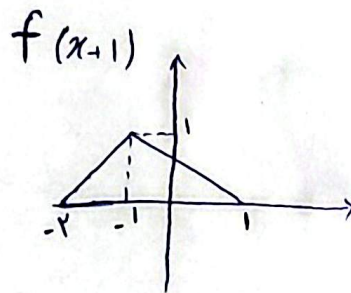
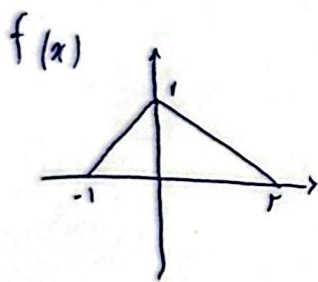
(2) -2

$$-1 \leq x \leq 3 \Rightarrow -1 \leq 3x \leq 9 \Rightarrow -1 \leq 3x+1 \leq 10 \Rightarrow -1 \leq \frac{3x+1}{2} \leq 5 \Rightarrow x \in [-1, 5]$$

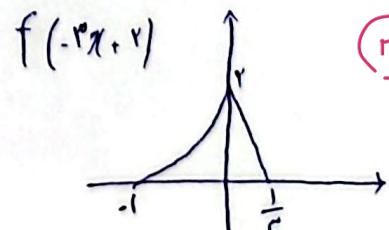
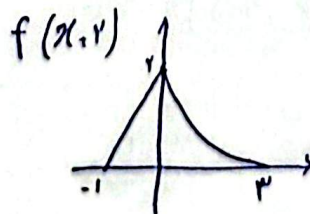
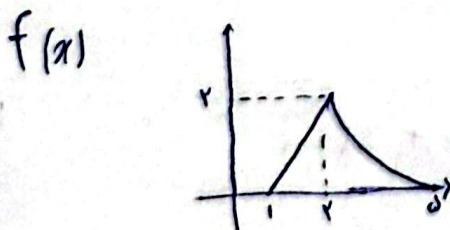
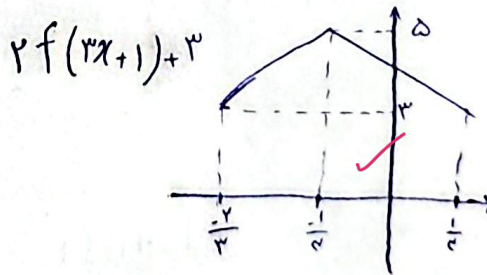
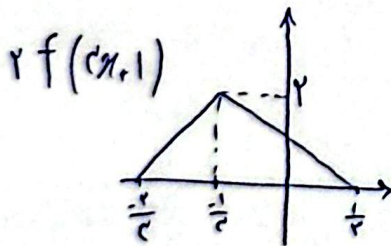
(2) -3

$$-1 \leq 2-x \leq 5 \Rightarrow -3 \leq -x \leq 7 \Rightarrow 3 \leq x \leq -7 \Rightarrow \frac{3}{\omega} \leq x \leq \frac{-7}{\omega}$$

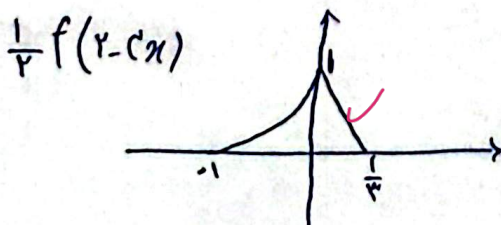
$$D_{f(2-x)} = \left[\frac{3}{\omega}, \frac{-7}{\omega}\right]$$



(2) -4



(2) -5



$$y = \frac{1}{\omega} x^r + \frac{r}{\omega} x + 1 \rightarrow x, \frac{-r}{\frac{1}{\omega}} = \frac{r}{\omega} \quad y_s = \frac{1}{\omega} \left(\frac{r}{\omega}\right)^r + \frac{r}{\omega} \left(\frac{r}{\omega}\right) + 1 = \frac{r^2}{\omega^2}$$

$$\frac{r}{\omega} + \alpha_s \varepsilon \Rightarrow \alpha = \frac{1}{\omega}$$

$$\frac{r^2}{\omega^2} + \beta = r \Rightarrow \beta = \frac{r\omega}{\omega^2}$$

$$y = \frac{1}{\omega} x^r + \frac{r}{\omega} x + 1 = \frac{r\omega}{\omega^2} \Rightarrow -\frac{r\omega}{\omega^2} x^r + \frac{r}{\omega} x + \omega = -\frac{r\omega}{\omega^2} \Rightarrow \frac{r\omega}{\omega^2} x^r - \frac{r}{\omega} x - \frac{r\omega}{\omega^2} = 0$$

$$x_1 = -\frac{1}{\omega} \quad x_r = \frac{1}{\omega}$$

$$-\frac{1}{\omega} + \frac{1}{\omega} = \frac{0}{\omega} = -\frac{r}{\omega}$$

$$\frac{1}{\omega} + \frac{1}{\omega} = \frac{2}{\omega} = \frac{r}{\omega}$$

$$r\alpha + r = 1 \Rightarrow \alpha = -\frac{1}{r}$$

$$1 - r f(1) = \beta \Rightarrow 1 - \frac{1}{r} \beta \Rightarrow \beta = -r$$

$$\alpha\beta = \frac{1}{r} \times -r = -1$$

$$D f(x-1) = (a+1, \omega]$$

$$D f(x+1) = [x, b-1)$$

$$D f(x-1) \cap D f(x+1) = (-r, \omega)$$

$$\Rightarrow a+1 = -r \Rightarrow a = -r-1$$

$$b-1 = \omega \Rightarrow b = \omega+1$$

$$a-b = -r-1 - (\omega+1) = -r-\omega-2$$

$$-r \leq x \leq \omega \Rightarrow \frac{x}{r} \leq \frac{\omega}{r} \Rightarrow \frac{x}{r} + 1 \leq \frac{\omega}{r} + 1 \Rightarrow D f(x) = [-\frac{\omega}{r}, \frac{\omega}{r} + 1] \Rightarrow D y_r = [-\frac{\omega}{r}, \frac{\omega}{r} + 1]$$

$$R y_r = R f\left(\frac{x}{r}\right) = R f(x) \Rightarrow -1 \leq f(x) \leq r \Rightarrow -r \leq r f(x) \leq r^2$$

$$\bullet \quad |r f(x) - c| \leq \omega \Rightarrow R y_r = [0, \sqrt{\omega}]$$

$$y(x) = f(x-r) + 1 = \left| \frac{(x-r)+1}{r(x-r)+1} \right| = \left| \frac{x-1}{rx-c} \right| + 1$$

$$g(x) = x \begin{cases} < 0 \\ > 0 \end{cases} \quad \left. \begin{matrix} g(x) < 0 \\ g(x) > 0 \end{matrix} \right\} x < 0$$

$$g(x) = \frac{x-1}{rx-c} + 1 \Rightarrow g(x) = \frac{rx-\varepsilon}{rx-c} \Rightarrow g(x) + x = \frac{rx-\varepsilon}{rx-c} + x \Rightarrow g(x) + x = \frac{rx^2 - \varepsilon x}{rx-c}$$

$$rx^2 - \varepsilon x < 0 \Rightarrow x^2 - \frac{\varepsilon}{r} x < 0 \Rightarrow x^2 > \frac{\varepsilon}{r} \Rightarrow \begin{cases} x > \sqrt{\frac{\varepsilon}{r}} \\ x < -\sqrt{\frac{\varepsilon}{r}} \end{cases} \quad x < \sqrt{\frac{\varepsilon}{r}}$$

-9

رأس: (h, k) $\xrightarrow{\text{معادله خط}}$ $y = a(n-h)^r + k = -\frac{1}{3}n^r + \frac{2}{5}n + 1 \rightarrow a = -\frac{1}{3}$

رأس: $(4, 3) \rightarrow y = -\frac{1}{3}(n-4)^r + 3 \xrightarrow{y=0} -\frac{1}{3}(n-4)^r = -3 \rightarrow \begin{cases} n=7 \\ n=1 \end{cases}$