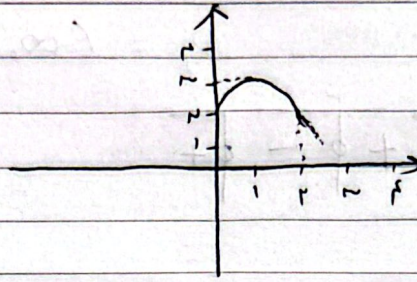


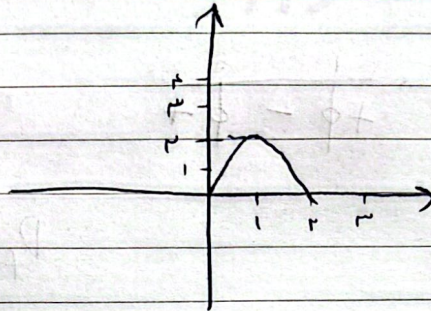
Subject:

$$f(x) + 2$$



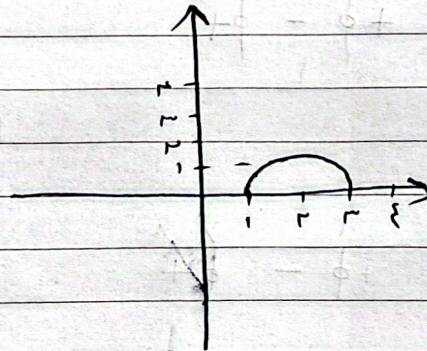
$$(x) - 1$$

$$f(x)$$



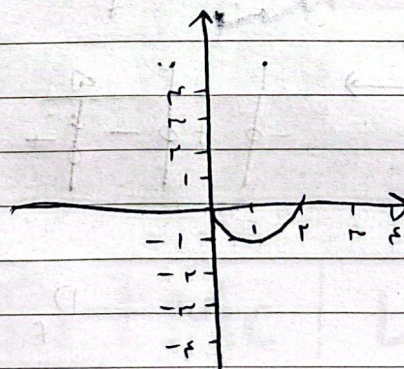
$$(x)$$

$$f(x-1)$$



$$(x)$$

$$-f(x)$$



$$(x)$$

IDEA

$$x^2 - 2x + 1 > 0$$

$$(x-1)(x-1) > 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad 1$$

$$\rightarrow$$

$$+ \quad - \quad +$$

$$D_f = (-\infty, 1) \cup (1, +\infty)$$

(الف-1)

$$x^2 - 4x + 4 < 0$$

$$(x-1)(x-4) < 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad 4$$

$$\rightarrow$$

$$+ \quad - \quad +$$

$$D_f = (1, 4)$$

(ب)

$$x^2 + 4x + 4 > 0$$

$$(x+1)(x+4) > 0$$

$$\downarrow \quad \downarrow$$

$$-1 \quad -4$$

$$\rightarrow$$

$$+ \quad - \quad +$$

$$D_f = (-\infty, -4] \cup [-1, +\infty)$$

(ج)

$$x^2 - 6x + 9 \leq 0$$

$$(x-1)(x-9) \leq 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad 9$$

$$\rightarrow$$

$$+ \quad - \quad +$$

$$D_f = [1, 9]$$

(د)

$$x^2 - 3x + 2 < 0$$

$$(x-1)(x-2) < 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad 2$$

$$\rightarrow$$

$$- \quad + \quad -$$

$$D_f = (-\infty, 1) \cup (2, +\infty)$$

(الف-2)

$$\frac{x^2 - 1}{x^2 - 4x + 4} \geq 0$$

$$(x-1)(x+1) \geq 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad -1$$

$$\rightarrow$$

$$+ \quad - \quad +$$

$$D_f = (-\infty, -1] \cup (4, +\infty)$$

(ب)

$$(x-1)(x-4) \geq 0$$

$$\downarrow \quad \downarrow$$

$$1 \quad 4$$

$$\rightarrow$$

$$+ \quad - \quad +$$

Subject:

$y = \frac{x^r - 1}{x^r - x} \rightarrow (x-1)(x^r + x^{r-1} + \dots + x + 1)$

$\Delta^r - \epsilon_{ac} = 1 - \epsilon = -r$

$\frac{-1}{+} \quad \frac{0}{-} \quad \frac{1}{+}$ $\rightarrow (-\infty, -1) \cup (0, +\infty) - \{1\}$

$$y = \sqrt{\frac{\omega^2 - 1}{\omega^2 - \omega_0^2 + \gamma}} \rightarrow \frac{(s - \gamma)(s + \gamma)}{(s - 1)(s - \gamma)} \rightarrow \frac{-\gamma}{s - 1} + \frac{\gamma^*}{s - \gamma} \quad D_f = (-\infty, -\gamma] \cup (1, +\infty) - \{\gamma\}$$

$$y = \sqrt{r^2 - x^2}$$

$r = x \geq 0 \Rightarrow x \leq r$

$$D_f = [-r, r] \quad (a = r)$$

$$r - \sqrt{r-x} > 0 \Rightarrow \sqrt{r-x} \leq r \Rightarrow r-x \leq 1 \Rightarrow x-r > -1 \Rightarrow x > -1$$

$$y = \sqrt{x - \sqrt{x - r}} \quad D_f = [r, 11] \quad ()$$

$$r - \sqrt{n-r} \geq 0 \Rightarrow \sqrt{n-r} \leq r \Rightarrow n-r \leq r^2 \Rightarrow n \leq 11$$

$y = \sqrt{r^2 + r^2}$
 $\downarrow r - r \sqrt{2} \geq 0$
 $-\sqrt{r}, +\sqrt{r}$
 $\begin{array}{c} -\sqrt{r} \quad +\sqrt{r} \\ - \quad + \quad - \end{array}$

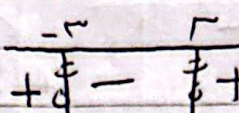
$$y = \sqrt{x|x|-9} \quad D_f = (-\infty, -3] \cup [3, +\infty) \quad (✓)$$

$r|x|-9 \geq 0$

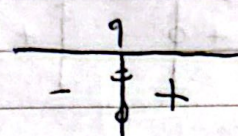
$+r, +r \xrightarrow{\downarrow}$

$+ \quad - \quad +$

$$y = \sqrt{\frac{|x|+1}{|x|-r}} \rightarrow \text{شعبي فناء} \quad D_f = (-\infty, -r) \cup (r, +\infty) \quad (ن) - \checkmark$$

$$\Rightarrow -r, r \text{ شعبي فناء}$$


$$y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-r}} \rightarrow \text{شعبي فناء} \quad D_f = (r, +\infty) \quad (ن) - \checkmark$$

$$\downarrow \quad x > 0$$


$$y = \frac{\sin x}{r \cos x - 1} \quad D_f = \mathbb{R} - \left\{ r k \pi + \frac{\pi}{2}, r k \pi + \frac{3\pi}{2} \right\} \quad (ن) - \checkmark$$

$$r(\cos x - 1) \neq 0 \Rightarrow \cos x \neq 1 \Rightarrow x \neq r k \pi + \frac{\pi}{2}, r k \pi + \frac{3\pi}{2}$$

$$y = \frac{\cos x + 1}{r \sin x + 1} \quad D_f = \mathbb{R} - \left\{ r k \pi - \frac{\pi}{2}, r k \pi - \frac{3\pi}{2} \right\} \quad (ن) - \checkmark$$

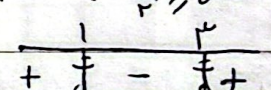
$$r \sin x + 1 \neq 0 \Rightarrow r \sin x \neq -1 \Rightarrow \sin x \neq -1/r \Rightarrow x \neq r k \pi - \frac{\pi}{2}, r k \pi - \frac{3\pi}{2}$$

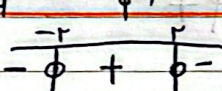
$$y = \frac{\tan x + r}{\cot x - 1} \quad \cos x \neq 0 \Rightarrow x \neq r k \pi \pm \frac{\pi}{2} \quad D_f = \mathbb{R} - \left\{ r k \pi \pm \frac{\pi}{2}, k \pi, k \pi + \frac{\pi}{2} \right\} \quad (ن) - \checkmark$$

$$\downarrow \quad \sin x \neq 0 \Rightarrow x \neq k \pi \quad \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow x \neq k \pi + \frac{\pi}{4}$$

$$y = \frac{\sin x + 1}{r \sin x - r} \rightarrow r \sin x - r \neq 0 \Rightarrow \sin x \neq 1 \Rightarrow \sin x \neq \frac{r}{r} \Rightarrow x \neq r k \pi + \frac{\pi}{2}, r k \pi + \frac{3\pi}{2} \quad D_f = \mathbb{R} - \left\{ r k \pi + \frac{\pi}{2}, r k \pi + \frac{3\pi}{2} \right\} \quad (ن) - \checkmark$$

$$y = \frac{1}{\sqrt{r|x-r| - \frac{1}{r}}} \rightarrow r|x-r| - \frac{1}{r} > 0 \Rightarrow r|x-r| > \frac{1}{r} \Rightarrow |x-r| > \frac{1}{r^2}$$

$$\Rightarrow x > r + \frac{1}{r^2} \quad x < r - \frac{1}{r^2}$$


$$y = \sqrt{r-|x|} \rightarrow -r, r \text{ شعبي فناء} \quad D_f = [-r, r] \quad (ن) - \checkmark$$


$$y = \sqrt{\frac{|x|}{|x|}} \quad \frac{|x|}{|x|} \geq 0 \quad D_f = \mathbb{R} - \{0\} \quad (ن) - \checkmark$$

$$\downarrow \quad x \neq 0$$

شعبي فناء عند 0