

Subject: المعادلات التفاضلية

المادة: حساب التفاضل والتكامل

①

$$x^2 - 2x + 10 + y + 4y = 0$$

$$x^2 - 2x + 10 - 2y + 10 + (y+2)^2 = 0$$

$$(x-1)^2 + (x-1)^2 + (y+2)^2 = 0$$

$$\boxed{x=1} \quad \boxed{y=-2}$$

$$k = 2 + 9 = 11$$

$$f(x) = \begin{cases} x^2 + 2x & x > a \\ 2x + a + 2 & x \leq a \end{cases} \quad (P)$$

$$x=a \quad a^2 + 2a = \frac{2a + a + 2}{1}$$

$$a^2 + a - 2 = 0 \Rightarrow (a+2)(a-1) = 0$$

$$\downarrow \quad \downarrow$$

$$a = -2 \quad a = 1$$

$$\Rightarrow a=1 \Rightarrow f(x) = \begin{cases} x^2 + 2x & x > 1 \\ 2x + 3 & x \leq 1 \end{cases}$$

$$x=1 \Rightarrow (1)^2 + 2(1) = a$$

$$a+b =$$

$$2 \leq x+1 \Rightarrow 1 \leq x$$

$$x+1 \leq 2$$

$$x \leq 1$$

$$f(x) = \begin{cases} x^2 - b & x+1 > 2 \\ a+2x & -2 \leq x+1 \leq 1 \end{cases} \quad (P)$$

$$x = -2 \Rightarrow 2 \times (-2)^2 - b = a + 2 \times (-2) - 2$$

$$12 - b = a - 4 \Rightarrow \boxed{a+b = 16}$$

$$y = \sqrt{4x-a} + \sqrt{b-2x} \quad (P)$$

$$\frac{b}{4} = \frac{a}{4} = 2$$

$$4x - a \geq 0$$

$$Df = \{2\}$$

$$4x \geq a \Rightarrow x \geq \frac{a}{4}$$

$$\Rightarrow \frac{b}{a} = \frac{4}{16} = \frac{1}{4}$$

$$b - 4x \geq 0 \Rightarrow b \leq 4x \Rightarrow \boxed{\frac{b}{4} \leq x}$$

$$y = \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+2x+4}} \Rightarrow x \geq 0 \quad (5)$$

$$\begin{aligned} \frac{x+1}{|x-3|} &\geq 0 \\ \frac{x+1}{1} &\geq 0 \\ x &\geq -1 \end{aligned}$$

$$\begin{aligned} x+1 &\geq 0 \\ x &\geq -1 \end{aligned}$$

«خياره» $(\oplus)$

$$|x-3| = 0 \Rightarrow x = 3$$

$$\begin{aligned} \frac{4-x}{x^2+2x+4} &\geq 0 \\ 4-x &\geq 0 \Rightarrow x \leq 4 \\ x^2+2x+4 &\geq 0 \\ \Delta = b^2 - 4ac &= 2^2 - 4 \times 1 \times 4 = 4 - 16 = -12 < 0 \end{aligned}$$

«گرايل»

$$\begin{array}{c} -1 \quad 3 \\ | \quad | \\ - \quad + \quad + \end{array}$$

$$\begin{array}{c} 4 \\ | \\ + \quad - \end{array}$$

$$D_f = [-1, 3) \cup (3, 4]$$

$$y = \sqrt{[x]-4} + \sqrt{4-[x]}$$

$$[x] - 4 \geq 0$$

$$[x] \geq 4$$

$$x \geq 4$$

$$4 - [x] \geq 0$$

$$4 \geq [x]$$

$$3 > x$$

$$D_f = \emptyset$$

$$\begin{array}{c} \cap \\ 0 \quad 1 \quad 2 \quad 3 \quad 4 \\ | \quad | \quad | \quad | \quad | \\ \hline 0 \end{array}$$

$$y = \sqrt{x^2 - x - 4} \Rightarrow (x-3)(x+2) = 0 \quad (6)$$

$$x^2 - x - 4 = 0 \Rightarrow x = \frac{1 \pm \sqrt{1+16}}{2} = \frac{1 \pm \sqrt{17}}{2}$$

$$x^2 - 4 = 0 \Rightarrow x = \pm 2$$

$$x^2 = 9 \Rightarrow x = \pm 3$$

$$(t-4)(t-9) = 0$$

$$\downarrow$$

$$\downarrow$$

$$\frac{+0 \overbrace{-}^{-r} -0 \overbrace{-}^{-r} -0 \overbrace{+}^{+r} +0 \overbrace{+}^{+r} +}{(x+r)(x-r)(x+r)(x-r)} \quad \text{--- 9}$$

$$D_f = (-\infty, -r) \cup (r, \kappa) \cup (\mu, +\infty)$$

ج. ضرایب $\Rightarrow$ توان های $\sqrt{\frac{x^2 - 2x^2 - 8x + 4}{x^2 + 2x^2 - 8x - 4}}$ $\Rightarrow$ توان های زوج با ضرایب برابر و توان های فرد با ضرایب متضاد

$$\begin{array}{r} 2x^2 - 10x + 7 \quad (x-1) \text{ پر } \underline{\text{بقسمة}} \\ \underline{2x^2 - 2x - 7} \\ 8x + 14 \\ \underline{8x - 8 - 14} \\ 22 \end{array}$$

$$y = \sqrt{\frac{(x-1)(x-r)(x+r)}{(x+1)(x-r)(x-r)}}$$

$$\begin{array}{r} x^r + 1x^r - 0x - 1 \quad | \quad x + 1 \\ x^r + x^r \\ \hline - \quad - \quad - \quad - \\ x^r - 0x \\ \hline 0x^r + x \\ \hline -4x - 4 \\ -4x - 4 \\ \hline 0 \end{array}$$

$$\begin{array}{ccccccccc} & -r & -r & -1 & 1 & r & r & & \\ & | & | & | & | & | & | & & \\ + & 0 & - & 0 & + & 0 & - & 0 & + \end{array}$$

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

$$\text{الف) } y = \sqrt{[-\infty] - x}$$

(v)

$$[-\infty] - x \geq 0 \Rightarrow [-\infty] \geq x \Rightarrow -\infty \geq x$$

$$x \leq -\infty$$

$$D_f = (-\infty, -\infty]$$

$$\text{ب) } y = \frac{x^2 + 4}{[x]^2 - 2[x] - 3}$$

$$[x]^2 - 2[x] - 3 \neq 0$$

$$([x] - 3)([x] + 1) \neq 0$$

$$[x] \neq 3 / [x] \neq -1$$

$$\Downarrow \quad \Downarrow$$

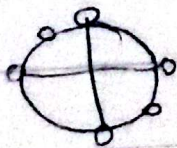
$$3 \leq x < \infty \quad -1 \leq x < 0$$

$$D_f = \mathbb{R} - \{ [3, \infty) \cup [-1, 0) \}$$

$$\text{الف) } y = \frac{\cot x + 1}{\tan x + 1} \quad \cot x = \frac{\cos x}{\sin x} \Rightarrow \sin x \neq 0$$

$$\tan x + 1 \Rightarrow \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1$$

(1)



$$\tan x = \frac{\sin x}{\cos x} \Rightarrow \cos x \neq 0$$

$$D_f = \mathbb{R} - \left\{ \frac{\pi}{2}, \pi - \frac{\pi}{2} \right\}$$

$$\text{ب) } y = \sqrt{1 - 2\sin^2 x}$$

$$(1 - \sin^2 x)(1 - 2\sin^2 x) = 0$$

$$1 - 2\sin^2 x \geq 0$$

$$1 \geq 2\sin^2 x \Rightarrow \frac{1}{2} \geq \sin^2 x$$



$$D_f = \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right]$$

$$\text{a)} y = \sqrt{1 - \log_{\frac{1}{f}} x - 1}$$

$$x - 1 \geq 0 \Rightarrow \boxed{x \geq 1}$$

(9)

$$1 - \log_{\frac{1}{f}} x - 1 \geq 0 \Rightarrow 1 \geq \log_{\frac{1}{f}} x$$

$$D_f = \left(1, \frac{f}{f-1} \right]$$

$$\frac{1}{f} \geq \log_{\frac{1}{f}} x - 1 \Rightarrow \boxed{\frac{f}{f-1} \geq x}$$

$$\text{b)} y = \frac{\sqrt{x^2 - x}}{1 - \log_{\frac{1}{f}} x^2 - x}$$

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

$$\begin{array}{c|c|c|c} & 0 & 1 & \\ \hline & + & - & + \end{array}$$

$$x^2 - x \geq 0 \Rightarrow x(x-1) \geq 0$$

$$1 - \log_{\frac{1}{f}} x^2 - x \neq 0$$

$$1 \neq \log_{\frac{1}{f}} x^2 - x$$

$$\begin{array}{c|c|c|c} & 0 & 1 & \\ \hline & + & - & + \end{array}$$

$$x \neq x^2 - x \Rightarrow x^2 - x - x \neq 0$$

$$\frac{(x-f)(x+1)}{f} \neq 0$$

$$(-\infty, 0) \cup (f, +\infty)$$

$$\Rightarrow D_f = (-\infty, 0) \cup (f, +\infty) - \{f, -1\}$$

$$\text{c)} y = \sqrt{\frac{x^2 - x}{x^2 - x - 1}}$$

(10)

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

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

$$\begin{array}{c} 1 \quad 3 \\ | \quad | \\ + \phi - \phi + \end{array}$$

$$D_f = [1, 3]$$

$$y = \left(\frac{3x + d}{2x + 2} \right)!$$

در آگوی جدید نویسی

$$\frac{3x + d}{2x + 2} \in W \Rightarrow 2xw + 2w \in 3x + d$$

$$2xw - 3x \in d - 2w$$

$$x(2w - 3) \in d - 2w$$

$$D_f = \left\{ x \mid x = \frac{d - 2k}{2k - 3}, k \in W \right\} \quad x \in \frac{d - 2w}{2w - 3}$$