سانیا جاوری

DATE : SUBJECT :

① $L = \frac{5}{4} W$

$L = \frac{1+\sqrt{5}}{2}$

$\frac{A_1}{A_0} = \frac{L_1 W}{L_0 W} = \frac{L_1}{L_0} = \frac{\varphi W}{(5/4) W} = \frac{4\varphi}{5}$

$\frac{A_1}{A_0} = \frac{4}{5} \times \frac{1+\sqrt{5}}{2} = \frac{2(1+\sqrt{5})}{5} \simeq 1.29$

② $\frac{\text{قطر}}{\text{طول}} = \varphi$

$d = \sqrt{L^2 + W^2}$ $\quad \frac{d}{L} = \varphi = \sqrt{1+\left(\frac{W}{L}\right)^2} = \varphi$

$1 + \left(\frac{W}{L}\right)^2 = \varphi^2 \rightarrow \left(\frac{W}{L}\right)^2 = \varphi^2 - 1 = \varphi$ $\quad \left(\frac{L}{W}\right)^2 = \frac{1}{\varphi}$

$\frac{1}{\varphi} = \varphi - 1 = \frac{\sqrt{5}-1}{2} = 0.61$

$3a + \sqrt{2a^2 + 4a} = 2$

$\sqrt{2a^2 + 4a} = 2 - 3a$ $\qquad \frac{a+1}{a} = \frac{\frac{2}{7}+1}{\frac{2}{7}} = \frac{\frac{2+7}{7}}{\frac{2}{7}} = \boxed{\frac{9}{2}}$

$2a^2 + 4a = (2 - 3a)^2$

$2a^2 + 4a = 4 - 12a + 9a^2$

$7a^2 - 16a + 4 = 0$ $\qquad \frac{16 \pm \sqrt{256 - 112}}{14}$

$a_1 = \frac{28}{14} = 2$ $\qquad a_2 = \frac{4}{14} = \frac{2}{7}$

FABER-CASTELL

DATE : SUBJECT : سارینا صادری

$$\frac{\sqrt{x+1}}{\sqrt{x-1}+3} - \frac{\sqrt{x+1}}{3-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}}$$

$$\frac{\sqrt{x+1}\,(\sqrt{x-1}-3)(\sqrt{x-1}+3)}{(x-1)-9} = \frac{\sqrt{x+1}\,(2\sqrt{x-1})}{x-10}$$

$$\frac{2\sqrt{(x+1)(x-1)}}{x-10} = \frac{x-1}{\sqrt{x-1}} \rightarrow \frac{4(x^2-1)}{(x-10)^2} = \frac{(x-1)^2}{x-1}$$

$$4(x^2-1) = (x-1)(x-10)^2$$

$$4x^2-4 = (x-1)(x^2-20x+100) \rightarrow 0 = x^3-25x^2+120x-96$$

$$x=1 \rightarrow (x-1)(x^2-24x+96)$$

$$x = 12-4\sqrt{3} = ⑵ \quad x = 12+4\sqrt{3} = 18 \; ⑴ \quad = 2$$ ریشه مثبت

ⓑ $$\frac{1}{\sqrt{2-x}+2} - \frac{1}{2-\sqrt{2-x}} = \frac{2-x}{5\sqrt{2-x}} \Rightarrow \frac{1}{t+2} - \frac{1}{2-t} = \frac{t^2}{5t}$$

$$t = \sqrt{2-x} \longrightarrow$$ ۲ ریشه مثبت

تکمیل سوال بالا

DATE : SUBJECT :

(۶) $\frac{1}{x^۲}+\frac{1}{(1-x)^۲}=\frac{۱۴۰}{۹}$

$x \neq (۰,۱)$

$۹\left((1-x)^۲+x^۲\right)=۱۴۰x^۲(1-x)^۲$

$-۱۴۰x^۴+۲۸۰x^۳-۱۵۸x^۲-۱۸x+۹=-(۴x-1)(۴x-۳)(۱۰x^۲-۱۰x-۳)=0$

$x=\frac{1}{۴},\ \frac{۳}{۴},\ \frac{1}{۲}\pm\frac{\sqrt{۵۵}}{۱۰}$

$-\frac{x^۳ \text{ ضریب}}{x^۴ \text{ ضریب}}=-\frac{۲۸۰}{-۱۴۰}=۲$

---

(۷) $\sqrt{x+\sqrt{-x^۳+۴x^۲+۲۵x-۱۰۰}+\sqrt{x^۲+\sqrt{-x^۲+۶x-۸}}}=x+۲$

$-(x-۴)(x+۵)(x-۵)$

$x=-۵,۴,۵$

$\to -x^۳+۴x^۲+۲۵x-۱۰۰\geq 0$

$x\in[-۵,۴]$

$\to x^۲+\sqrt{-x^۲+۶x-۸}\geq 0$

$x=۴$

$-x^۲+۶x-۸\geq 0$

---

(۸) $y=|x+۲|+|x-1|$ $\quad x+۲y=۱۷$

$x<-۲ \to |x-1|=-x+1 \to y=(-x-۲)+(-x+1)=-۲x-1$

$|x-1|=-x+1$ و $|x+۲|\ x+۲$

$y=(x+۲)+-x+1=۳ \to |x-1|=x-1, |x+۲|=x+۲$

$y=(x+۲)+(x-1)=۲x+1$ | $AB=\sqrt{(x_۲-x_1)^۲+(y_۲-y_1)^۲}=\sqrt{۳۶+۴^۲}$ $۲\sqrt{۱۰}$

$x<-۲ \to y=-۲(-۴)-1=۷$ | $(-۴,۷)$ $x\geq 1 \to y=۲(۲)+1=۵$

FABER CASTELL

DATE : SUBJECT : [illegible]

$y = \sqrt{x^2 - 4x + 4}$ $y = \frac{1}{2}x + 2$

$\sqrt{(x-2)^2} = |x-2|$

$y_1 = |x-2| , y_2 = \frac{1}{2}x + 2$

$x \geq 2 \rightarrow |x-2| = x-2$

$x - 2 = \frac{1}{2}x + 2 \Rightarrow \frac{1}{2}x = 4 \rightarrow \boxed{x = 8}$

$\rightarrow A(8,6)$ $x < 2 \rightarrow |x-2| = 2 - x$

$2 - x = \frac{1}{2}x + 2 \rightarrow -x - \frac{1}{2}x = 0 \rightarrow -\frac{3}{2}x = 0 \rightarrow x = 0$

$B(0,2)$ $A_1 = 3$

$y_1 = 2 - x$ $y_2 = \frac{1}{2}x + 2 \rightarrow A = A_1 + A_2 = \boxed{3 + 9 = 12}$

$A_2 = 18 \div 2 = 9$

---

(1) $\frac{1}{x-9}$ $\frac{1}{x} \rightarrow \frac{1}{x} + \frac{1}{x-9} = \frac{1}{20}$

$\frac{2x-9}{x(x-9)} = \frac{1}{20}$

$20(2x-9) = x(x-9)$

$40x - 180 = x^2 - 9x$

$x^2 - 49x + 180 = 0$

~~$\sqrt{49^2 - 4 \times 180} = \frac{49 \pm 41}{2}$~~

$x = \frac{49 \pm 41}{2} = 45 , ~~4~~$

$x = 45 \rightarrow \boxed{x - 9 = 36}$

FABER CASTELL