

IV

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نسب: $\frac{m-k}{x-c-r} = -\frac{1}{r} \Rightarrow m-k = -r$

$S_{AB} = (x-c-r)^2 + (m-k)^2 = 3^2 + 9 = 18$

A (-1, 1)

B (3, 1)

C (x, y)

D (-1, x, y, r)

AB, B-A = (3-c-1), 1-1 = (2, 0)

BC = (x-3, y-1) $\Rightarrow (2, 0) \cdot (x-3, y-1) = 0$

$2(x-3) - 0(y-1) = 0$

A + C = B + D $\Rightarrow (-1, 1) + (x, y) = (3, 1) + (-1, x, y, r)$

$\Rightarrow x-1 = 3-x \Rightarrow 2x=4 \Rightarrow x=2$ $y=1$

$\Rightarrow |AB| = \sqrt{2^2 + 0^2} = 2 \Rightarrow BC = C-B = (2-3, 1-1) = (-1, 0) \Rightarrow |BC| =$

$\frac{\sqrt{1+0}}{\sqrt{2}} = \frac{1}{\sqrt{2}}$

$\therefore 2(|AB| + |BC|) = 2(2 + 1) = 6$

$$\tan \theta' = \sqrt{r} \cdot m'$$

$$(m' = 1) y = rmx + r$$

$$m' = \sqrt{r} = \frac{-rm}{m^2 - 1} \Rightarrow$$

$$\sqrt{r}m^2 - \sqrt{r} = -rm$$

$$\sqrt{r}m^2 + rm - \sqrt{r} = 0$$

$$\text{Discriminant} = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{r^2 + 4r}}{\sqrt{r}} = \left(\frac{r}{\sqrt{r}} \right)$$

$$AH \perp BC$$

$$BC \Rightarrow m = \frac{11-r}{r-r} = r$$

$$y = rx + b$$

$$r = 9 + b$$

$$b = -r$$

$$y = rx - r$$

$$y - rx + r = 0 \quad (1)$$

$$\frac{|9 - r + r|}{\sqrt{1+r}} = \frac{1}{\sqrt{r}} = \frac{r \times r}{r^2} = \left(\frac{r}{\sqrt{r}} \right)$$

$$A(1, 9)$$

$$AB: y = -rx + r \Rightarrow ry = -x + 1 \quad (1)$$

$$AC: ry = rx + 1r$$

$$BC: ry = rx - 1r \quad (2)$$

$$B: (1) = (2) \Rightarrow -x + 1 = rx - 1r$$

$$rr = 11r$$

$$r = 11$$

$$y = -rx + r = 1$$

$$B(1, 1)$$

$$AC: ry = rx - 1r$$

$$\frac{|1 - 9 - 1r|}{\sqrt{r^2 + r}} = \left(\frac{rr}{r} \right)$$

$$\frac{x}{-\frac{r}{l}} = \frac{y}{-\frac{r}{l}} = 1 \Rightarrow \frac{y}{x} = -\frac{r}{x} - 1 \Rightarrow y = -rx - r$$

$$\Rightarrow -1 \cdot r = -r \Rightarrow r = -r \Rightarrow r = \frac{-r}{1} = -r$$

$$d = \frac{r}{\sqrt{1+1}} = \frac{r}{\sqrt{2}}$$

$$y - rx = 1 \Rightarrow m = \frac{a}{1} = a$$

$$ay - x = a - 1 \Rightarrow m' = \frac{1}{a} \Rightarrow a = \frac{1}{a} \Rightarrow a = \pm 1 \quad \checkmark$$

$$a = 1 \Rightarrow \begin{cases} y - x = 1 \\ y - x = 0 \end{cases}$$

$$a = -1 \Rightarrow \begin{cases} y + x = 1 \\ y - x = -1 \end{cases} \Rightarrow \begin{cases} x - y + 1 = 0 \\ x - y = 0 \end{cases} \Rightarrow d = \frac{|1-0|}{\sqrt{1+1}} = \frac{1}{\sqrt{2}}$$

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

$$x^2 = r^2 \Rightarrow x = \frac{r}{\sqrt{2}} \Rightarrow d = \frac{r}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{r}{2} \quad \text{B, A, C}$$

$$AB = \frac{|1-0-1|}{\sqrt{1+1}} = \frac{1}{\sqrt{2}} \quad \checkmark$$

$$t_{AC} = m_{BC} = \frac{1}{r}$$

$$t_{AC} = \frac{AB}{AC} = \frac{1}{r} \Rightarrow BC = \frac{1}{r} \Rightarrow d = \frac{1}{r} \times \frac{1}{\sqrt{2}} = \frac{1}{r\sqrt{2}}$$

$$(1, r\sqrt{2})$$

$$m = \frac{a-b}{\frac{1}{a} - \frac{1}{b}} = \sqrt{3} \Rightarrow a-b = \frac{\sqrt{3}}{6}$$

-9

$$|AB| = \sqrt{(a-b)^2 + (\frac{1}{a} - \frac{1}{b})^2} = \sqrt{\frac{3}{36} + \frac{1}{36}} = \sqrt{\frac{1}{9}} = \frac{1}{3}$$

$$\text{طول} = \sqrt{2} \times |AB| = \frac{\sqrt{2}}{3}$$

-10

$$r = \sqrt{x^2 + y^2} = d \Rightarrow x^2 + y^2 = r^2 \Rightarrow$$

$$m = \frac{-\frac{\epsilon}{r}}{-\frac{r}{\epsilon}} = \frac{\epsilon}{r} \Rightarrow m = -\frac{r}{\epsilon} \Rightarrow y = -\frac{r}{\epsilon} x + \frac{r d}{\epsilon} \quad (\text{نقطه}) \Rightarrow$$

$$y = -\frac{r}{\epsilon} x + \frac{r d}{\epsilon} \Rightarrow y = -\frac{r}{\epsilon} x + \frac{r d}{\epsilon} \Rightarrow$$

$$\frac{-r}{\epsilon} x + \frac{r d}{\epsilon} \Rightarrow y = \frac{\epsilon}{r} x + b \Rightarrow \frac{|b|}{\sqrt{1+m^2}} = d \Rightarrow |b| = \frac{r d}{\epsilon}$$

$$\frac{|b|}{\frac{d}{r}} = d \Rightarrow |b| = \frac{r d}{\epsilon} \Rightarrow y = \frac{\epsilon}{r} x + \frac{r d}{\epsilon} \Rightarrow \frac{r d}{\epsilon} = \frac{d}{r} \Rightarrow r = \frac{d}{r} \Rightarrow r^2 = d \Rightarrow r = \sqrt{d}$$

$$y = -\frac{r}{\epsilon} - \frac{r d}{\epsilon}$$

$$y = \frac{\epsilon}{r} x + \frac{r d}{\epsilon} \Rightarrow 1 \times \left(\frac{\epsilon}{r} x + \frac{r d}{\epsilon} \right) = -1 \Rightarrow x = -\frac{r}{\epsilon} \Rightarrow x = -\sqrt{d}$$

$$y = \frac{\epsilon}{r} (-\sqrt{d}) + \frac{r d}{\epsilon} = -\frac{r}{\epsilon} = -1 \Rightarrow (-\sqrt{d}, -1) \Rightarrow -\sqrt{d} \times 1 = \sqrt{d}$$

dotnote