Pag 972 n 745

$$x^2-(k+6)x+\underbrace{k+9}=0$$
$$ax^2+\ bx\ \ +c$$

(a) Radici non reali $\longleftrightarrow$ $\Delta<0$

$$\Delta=[-(k+6)]^2-4\cdot1\cdot(k+9)<0$$
$$k^2+\cancel{36}+12k-4k-\cancel{36}<0$$

$$k^2+8k<0 \quad \leadsto \quad k(k+8)<0$$

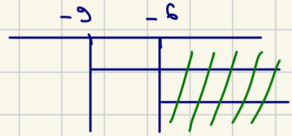
$f_1>0$ $k>0$
$f_2>0$ $k>-8$

		-8		0	
f_1	$-$		$-$		$+$
f_2	$-$		$+$		$+$
	$+$		$-$		$+$

$\leadsto$ $-8<k<0$

(b) Radici positive $\longleftrightarrow$ $\begin{cases} x_1x_2>0 \\ x_1+x_2>0 \end{cases}$ (perché prodotto di + è +)
(somma di + è +)

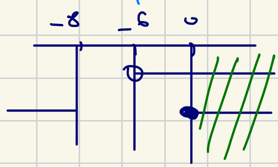
$$\begin{cases} \frac{c}{a}>0 \\ -\frac{b}{a}>0 \end{cases} \qquad \begin{cases} k+9>0 \\ k+6>0 \end{cases} \qquad \begin{cases} k>-9 \\ k>-6 \end{cases}$$



$k>-6$ $\longleftrightarrow$ Va messo a sistema con il fatto che le soluzioni sono reali, cioè $\Delta\geq0$

$\Delta\geq0$ $\longleftrightarrow$ $\underbrace{k\leq-8 \ \vee\ k\geq0}_{\text{complementare sopra}}$

Faccio ora sistema tra le due $k>-6$
$k\leq-8 \ \vee\ k\geq0$



$\leadsto$ Sol finale $k\geq0$

(c) $x_1 + x_2 = \frac{2}{3} x_1 x_2$

$-\frac{b}{a} = \frac{2}{3}\frac{c}{a} \rightsquigarrow k+6 = \frac{2}{3}(k+9) \rightsquigarrow 3k + \cancel{18} = 2k + \cancel{18} \rightsquigarrow k=0$

$k=0$ va bene perché verifica $\Delta \geq 0$

(d) $x_1 = \frac{2}{5} x_2$ Hard:

$\frac{x_1}{x_2} = \frac{2}{5}$ quanto fa $\frac{x_2}{x_1} = \frac{5}{2}$

Quanto fa $\frac{x_1}{x_2} + \frac{x_2}{x_1} = \frac{2}{5} + \frac{5}{2} = \frac{4+25}{10} = \frac{29}{10}$

$\frac{x_1^2 + x_2^2}{x_1 x_2} = \frac{29}{10} \rightsquigarrow \frac{(x_1+x_2)^2 - 2x_1x_2}{x_1 x_2} = \frac{29}{10}$

$\frac{[(k+6)]^2 - 2(k+9)}{k+9} = \frac{29}{10}$

$\frac{k^2 + 36 + 12k - 2k - 18}{k+9} = \frac{29}{10}$

$(k^2 + 10k + 18)\,10 = 29\,(k+9)$

$10k^2 + 100k + 180 = 29k + 261$

$10k^2 + 71k - 81 = 0$

$10k^2 + 81k - 10k - 81 = 0$

$10k(k-1) + 81(k-1) = 0$

$(10k+81)(k-1) = 0 \rightsquigarrow k = -\frac{81}{10}$

$k = 1$

Acc.

(e) $x_1 - 3x_1x_2 > 5 - x_2$

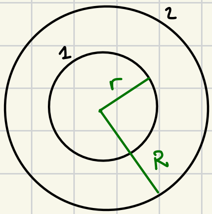
$x_1 + x_2 - 3x_1x_2 - 5 > 0$ $\qquad -\frac{b}{a} - 3\frac{c}{a} - 5 > 0$

$k+6 - 3(k+9) - 5 > 0$

$k+6 - 3k - 27 - 5 > 0$

$2k < -26 \rightsquigarrow \boxed{k < -13}$ Acc.

Pag 935 n 280



Area cerchio $= r^2\pi$ $r<R$

$A_2 - A_1 = 36\pi$

$\dfrac{C_2}{C_1} = \dfrac{5}{4}$ r, R

$$\begin{cases} R^2\pi - r^2\pi = 36\pi \\ \dfrac{\cancel{2}R\cancel{\pi}}{\cancel{2}r\cancel{\pi}} = \dfrac{5}{4} \end{cases} \qquad \begin{cases} \cancel{\pi}(R^2 - r^2) = 36\cancel{\pi} \\ 4R = 5r \rightsquigarrow R = \dfrac{5}{4}r \end{cases}$$

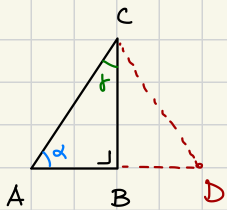
$$\frac{25}{16}r^2 - r^2 = 36 \rightsquigarrow \left(\frac{25-16}{16}\right)r^2 = 36 \rightsquigarrow \frac{9}{16}r^2 = 36$$

$$\rightsquigarrow r^2 = \frac{\overset{4}{\cancel{36}}\cdot 16}{\cancel{9}} \quad r^2 = 64 \quad \rightsquigarrow r = \pm 8$$

Dato che $r>0$, $r=8 \rightsquigarrow R = \frac{5}{4}r = 10$

Triangoli rettangoli con angoli di $\boxed{\frac{\pi}{3}, \frac{\pi}{4}, \frac{\pi}{6}}$ $(60°, 45°, 30°)$

Triangolo rett. con angolo di $\frac{\pi}{3}$ (e di conseg $\frac{\pi}{6}$)



$\alpha = \frac{\pi}{3}$

$\gamma = \pi - \frac{\pi}{2} - \frac{\pi}{3} = \frac{6-3-2}{6}\pi = \frac{\pi}{6}$

$$\boxed{\begin{aligned} AC &= \ell \\ AB &= \frac{\ell}{2} \\ BC &= \frac{\sqrt{3}}{2}\ell \end{aligned}}$$

AC lo conosco e vale ℓ
Quanto valgono AB e BC ?

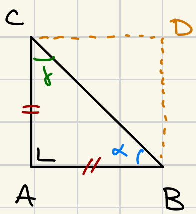
Per il teorema di Pitagora so che $AB^2 + BC^2 = \ell^2$
Specchio il triangolo $\overset{\triangle}{ABC}$ e trovo un triangolo $\overset{\triangle}{ADC}$ equilatero (conteggio su angoli)

$$\Rightarrow \quad AD = AC \quad \Rightarrow \quad AB = \frac{AC}{2} = \frac{\ell}{2}$$

Posso ricavare BC $\rightsquigarrow$ $BC^2 = \ell^2 - \left(\frac{\ell}{2}\right)^2 = \frac{4\ell^2 - \ell^2}{4} = \frac{3}{4}\ell^2$

$$\rightsquigarrow \quad BC = \frac{\sqrt{3}}{2}\ell$$

Triangolo rett. con angolo $\frac{\pi}{4}$



$\alpha = \frac{\pi}{4}$

$\gamma = \pi - \frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}$

$AB = \ell$ $\rightsquigarrow$ quanto valgono AC e BC

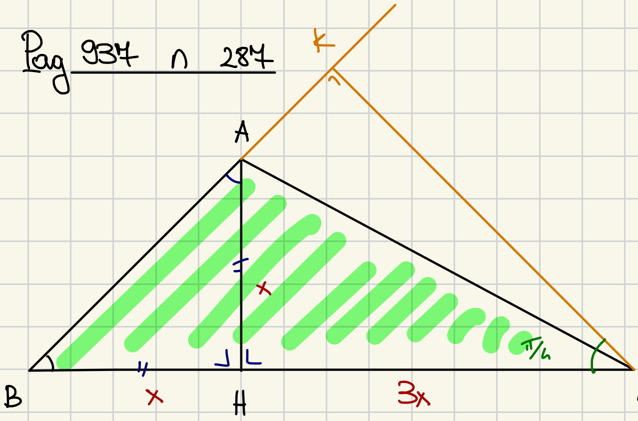
$$\boxed{\begin{aligned} AB &= \ell \\ AC &= \ell \\ BC &= \sqrt{2}\,\ell \end{aligned}}$$

Dato che $\alpha = \gamma \Rightarrow AB = AC = \ell$

Per il teorema di Pitagora $BC^2 = AB^2 + AC^2 = \ell^2 + \ell^2 = 2\ell^2$
$BC = \sqrt{2}\,\ell$

Secret Story: ABDC è un quadrato con BC diagonale

Pag 937 n 287



$A_{ABC} = 32\, m^2$ $\qquad \frac{BH}{HC} = \frac{1}{3}$

$\hat{B} = \frac{\pi}{4}$

$P = 2p = ?$

$CK = ?$

(Si può approcciare con "fisso incognite e uso quelle per tutto")

(1) $BH = AH$ per triangolo di $\frac{\pi}{4}$

(2) $\frac{BC \cdot AH}{2} = 32 \rightsquigarrow \frac{(BH+HC)\cdot BH}{2} = 32$ Area

$$\begin{cases} \frac{BH}{HC} = \frac{1}{3} \\ \frac{(BH+HC)BH}{2} = 32 \end{cases} \qquad \begin{cases} 3BH = HC \\ 4BH^2 = 64 \rightsquigarrow BH^2 = 16 \rightsquigarrow BH = \pm 4 \\ \rightsquigarrow BH = 4 \text{ perché } BH > 0 \end{cases}$$

$\rightsquigarrow$ $BH = 4$ $\qquad AH = 4$

$HC = 12$

$BC = 12 + 4 = 16$

$AB = AH \cdot \sqrt{2} = 4\sqrt{2}$

$$AC^2 = AH^2 + HC^2 = 4^2 + 12^2 = \overset{4^2 + 4^2 \cdot 3^2}{4^2(1+3^2)} = 4^2 \cdot 10$$

$AC = 4\sqrt{10}$

$2p = AB + BC + AC = 16 + 4\sqrt{2} + 4\sqrt{10} = 4(4 + \sqrt{2} + \sqrt{10})$

$A = \frac{AB \cdot CK}{2} \Rightarrow CH = \frac{2A}{AB} = \frac{64}{4\sqrt{2}} = \frac{16}{\sqrt{2}} = 8\sqrt{2}$

Grazie FF e AB, ma idea più facile