

# M<sub>a</sub>th

Beh Kóng 5-4-3 Ė Tāi-chì

---Siong-ko Tēng-lí

Liân-chong

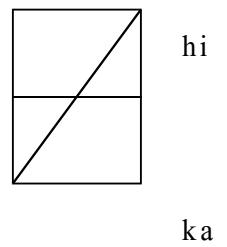
Lán ê hōe-tiú<sup>n</sup> Tiu<sup>n</sup> I-su bat kā Chong-a kóng chá-chêng ū lâng iōng Lô-má-jī siá Sò-hák thòk-pún, iā kā Chong-a bián-lē, hoan-hù Chong-a mā lâi siá Sò-hák. Chong-a kā chiah-ê ōe kín-kì chāi-sim, m̄-kú sì-kè chhiau-chhōe, lóng chhōe bô kah-ì ê tê-bák. Kàu-ta<sup>n</sup> hák-hāu ê ē-hák-kî í-keng teh beh kiat-sok lah, Chong-a chéng-lí ka-kī ê pān-kong-toh-á, sòa lâi khòa<sup>n</sup> tiōh chit-tiu<sup>n</sup> kū-nî Kàu-su-chiat hák-seng sàng hō Chong-a ê khah-phì<sup>n</sup>. Chit tiu<sup>n</sup> khah-phì<sup>n</sup> ê chià<sup>n</sup>-bīn sī áñ-ni siá: Beh kā Lāu-su kóng kóa 5-4-3 ê ōe, lāi-bīn lóng siá in ê ñg-bāng, siōng hó sī hō in lóng phah-suh(pass). Hit-tiáp Chong-a chhin-chhiū<sup>n</sup> khì hō lûi-kong sih-nā tiān-- tiōh, chhiau-chhōe chiok-kú ê tê-bák chiū tī gán-chiān. Chiū-sī Sò-hák mā ū kóng 5-4-3 ê tāi-chì, chit-ê Sò-hák hō-chò Siong-ko Tēng-lí, se-iû<sup>n</sup>-lâng kā i kiò-chò Pit-tah-ko-la-su Tēng-lí.

Sím-mih hō-chò Siong-ko Tēng-lí? Lí nā thák chho-tiong it-tēng bat chò-kòe ē-kha ê sò-hák:

$$3^2 + 4^2 = 5^2 \text{ ----- (1),}$$

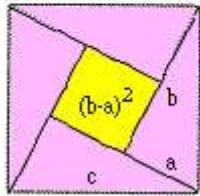
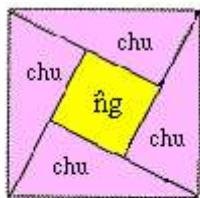
$$\text{á-sī } a^2 + b^2 = c^2 \text{ ----- (2)}$$

Chit-ê chiū-sī Siong-ko Tēng-lí. Mā ū lâng kā in kiò-chò Kau-kó-hiân Tēng-lí, á-sī Pit-tah-ko-la-su Tēng-lí. Chha-put-to tī se-gôan chêng 1100 nî, Tiong-kok Chiu-tiâu ū chit-ê koa<sup>n</sup>-ôan hō-chò Siong- ko, i bat kóng tiòh kau-sa<sup>n</sup>, kó-sì, hiân-gō<sub>(chù 1)</sub> ê tit-kak sa<sup>n</sup>-kak-hêng ê koan-hē, chhin-chhiū<sup>n</sup> tē-1 ê sò-hák sek án-ni. Nā-sī it-poa<sup>n</sup>-tek ê Siong-ko Tēng-lí, chhin-chhiū<sup>n</sup> tē-2 ê sò-hák sek, sī kì-chài tī Chiu-pī-sìng-keng<sub>(chù 2)</sub>, Tân-chú<sub>(chù 3)</sub> kóng: Beh sìng jit(日) ê tùi-kak sio-liân chhiâ-chōa ê tñg, iōng jit ê ē-kha hôai<sup>n</sup>-chōa ê tñg -1 chiâ<sup>n</sup> chò kau, tit-chōa ê tñg chiâ<sup>n</sup> chò kó, kau ê pêng-hong ka kór ê pêng-hong, chóng-sò khui pêng-hong-kin chiū-sī chhiâ-chōa ê tñg, iā chiū-sī hiân ê tñg, chhin-chhiū<sup>n</sup> tô-1.

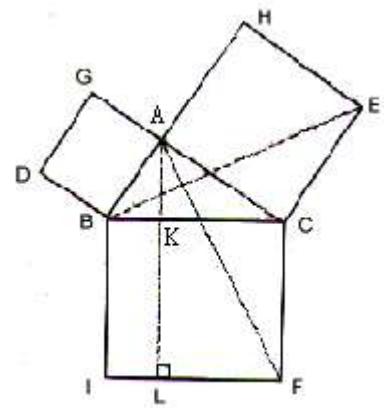


hi

ka

tôtô-2

Siong-ko Tēng-lí sī Tiō-sóng (chù 4) iōng biān-chek ê ūi-tô-hoat lâi chèng-bêng..ê, chhin-chhiū<sup>n</sup> tō-2. I kā chiâ<sup>n</sup> chò tit-kak sa<sup>n</sup>-kak-hêng ê kau(a ê tñg) kap kó(b ê tñg) sêng chò-hóe, chiū-sī chu-sek sa<sup>n</sup>-kak-hêng biān-chek ê nñg-põe, iā chiū-sī nñg-tè chu-sek sa<sup>n</sup>-kak-hêng ê biān-chek. I kā kór kiám kau só chhun ê tñg (b-a) lâi pêng-hong, chiâ<sup>n</sup>-chò tiong-ng ñg-sek sì-kak-hêng ê biān-chek. Tiō-sóng kā sì-tè chu-sek sa<sup>n</sup>-kak-hêng kap hit-tè ñg-sek sì-kak-hêng ê biān-chek kap chò-hóe, chiū-sī iōng hiân(c ê tñg) pêng-hong sór chiâ<sup>n</sup> chò sì-kak-hêng ê biān-chek. Chit-má iōng sòr-hák sek lâi siá, chiū-sī án-ni:



$$4 \left( \frac{1}{2}ab \right) + (b-a)^2 = c^2, \text{ chit-ê sòr-hák sek tián-} \\ \text{khui, chiū ê tit-tiôh}$$

$$a^2 + b^2 = c^2$$

Se-iû<sup>n</sup>-lâng Pit-tah-ko-la-su (Pythagorean) tâi-iok tī Se-gôan 500 nî chêng hoat-hiän chit-ê têng-lí, m̄-kú i chái<sup>n</sup>-iû<sup>n</sup> chèng-bêng chit-ê têng-lí kàu-ta<sup>n</sup> bô lâng chai-iá<sup>n</sup>. Siá Kí-hô-hák ê O-chi-lî-tô (chù 5) ū kā Pit-tah-ko-la-su Têng-lí chò chin bêng-khak ê chèng-bêng, iā chiū-sī lán thák chho-tiong bat chò--tiôh ê tê-bâk.

Ē-kha chiū lâi chèng-bêng: Uì tit-kak sa<sup>n</sup>-kak-hêng ABC ê múi chit-pi<sup>n</sup> chò chià<sup>n</sup>-hong-hêng, chhin-chhiū<sup>n</sup> tô-3. Koh lâi chò tit-sòa<sup>n</sup> AL hām IF chiâ<sup>n</sup>-chò tit-kak, liân-chiap AF kap BE. Uì Kí-hô gôan-lí chai-iá<sup>n</sup>:

$\Delta \text{ AFC} \cong \Delta \text{ EBC}$ , tiâu-kiā<sup>n</sup> sī AC = EC, FC = BC,  $\angle ACF = \angle ECB$ , chiū-sī SAS<sub>(chù 5)</sub> ê chôan-jiān sio-siâng.

$\Delta \text{ EBC}$  ê biān-cheek sī CE ê tâng sêng kôan EH koh hō 2 lâi pun, chiū-sī  $\Delta \text{ EBC}$  =  $\frac{1}{2} \overline{CE} \cdot \overline{EH}$ , kap  $\Delta \text{ CEH}$  ê biān-cheek sio-siâng, chià<sup>n</sup>-hong-hêng ACEH ê biān-cheek tú-hó sī  $\Delta \text{ CEH}$  ê n̄ng-pōe, iā sī  $\Delta \text{ EBC}$  ê n̄ng-pōe.

$\Delta \text{ AFC}$  ê biān-cheek sī  $\frac{1}{2} \overline{CF} \cdot \overline{FL}$  kap  $\Delta \text{ CFL}$  ê biān-cheek sio-siâng, tâng-hong-hêng CFLK ê biān-cheek sio-siâng.

CFLK ê biān-cheek sī  $\Delta \text{ CFL}$  ê n̄ng-pōe, iā sī  $\Delta \text{ AFC}$  ê n̄ng-pōe.

In-ūi  $\Delta \text{ AFC} \cong \Delta \text{ EBC}$ , só-í tâng-hong-hêng CFLK ê biān-cheek kap chià<sup>n</sup>-hong-hêng ACEH ê biān-cheek pê<sup>n</sup> tōa.

Kāng-khóan tō-lí, lán ūe-tit-thang chèng-bêng tâng-hong-hêng BILK ê biān-cheek kap chià<sup>n</sup>-hong-hêng ABDG ê biān-cheek pê<sup>n</sup> tōa. Tâng-hong-hêng CFLK ê biān-cheek hām tâng-hong-hêng BILK ê biān-cheek sio kap, tú-hó sī chià<sup>n</sup>-hong-hêng BCFI ê biān-cheek.

Chià<sup>n</sup>-hong-hêng BCFI ê biān-cheek ē-tàng iōng  $\overline{BC}^2$  lâi piáu-sī, ABDG ê biān-cheek iōng  $\overline{AB}^2$  piáu-sī, ACEH ê biān-cheek iōng  $\overline{AC}^2$  piáu-sī, só-í Pit-tah-ko-la-su Tēng-lí chiū án-ni siá:

$$\overline{AB}^2 + \overline{AC}^2 = \overline{BC}^2 , \text{ che kap it-poa}^n\text{-tek ê Siong-ko Tēng-lí sio-siāng.}$$

Pit-tah-ko-la-su Tēng-lí lán lóng kā i kiò chò Pit-sì Tēng-lí, í-siōng ê chèng-bêng it-tēng ài ū O-chi-lī-tô ê Kí-hô-hák chò ki-chhór. Nā-sī lí thák kah bū-sà-sà, chhiá<sup>n</sup> lí m̄-bián lóe-chì, èng-kai sī Chong-a piáu-tát ê hong-hoat bô kàu chiâu-chñg. Chong-a ê khan-chhiú thák liáu, án-ni kā Chong-a kóng: “Lâng nā-sī àm-sî khùn bōe khì, thêh chit phi<sup>n</sup> 5-4-3..ê khì thák, pō-chèng sùi khùn--khì.”

Chù 1 kau-sa<sup>n</sup>( 勾三 ), kó-sì( 股四 ), hiân-gō( 弦五 )

Chù 2 Chiu-pī-sòng-keng( 周髀算經 )

Chù 3 Tân-chú( 陳子 )

Chù 4 Tiō-sóng( 趙爽 )

Chù 5 O-chi-lī-tô(Euclid)