

第2回 高2トップレベル記述模試 数学 解答用紙 [No. 4]

※採点者記入欄

4 (1) $\cos C = \frac{CH}{b}$
 $\cos B = \frac{BH}{c}$ ①
 $b \cos C + c \cos B = b \cdot \frac{CH}{b} + c \cdot \frac{BH}{c}$
 $= CH + BH$
 $= BC = a$ (1) +5

(2) ④に⑤を代入して
 $a^2 = c^2 + a^2 - 2ca \cos B + c^2 - 2bc \cos A$
 $2c^2 = 2ca \cos B + 2bc \cos A$
 $c \neq 0 \therefore$
 $c = a \cos B + b \cos A$... ③
 ①, ②も同様に証明できる (2) +6

(3) ①×a - ②×bより
 $a^2 = abc \cos C + ac \cos B$
 $-) b^2 = bcc \cos A + abc \cos C$
 $a^2 - b^2 = acc \cos B - bcc \cos A$
 $= c(a \cos B - b \cos A)$

③を代入して
 $a^2 - b^2 = (a \cos B + b \cos A)(a \cos B - b \cos A)$
 $= a^2 \cos^2 B - b^2 \cos^2 A$

$\cos^2 A = 1 - \sin^2 A$
 $\cos^2 B = 1 - \sin^2 B$ ①

$a^2 - b^2 = a^2(1 - \sin^2 B) - b^2(1 - \sin^2 A)$
 $= a^2 - a^2 \sin^2 B - b^2 + b^2 \sin^2 A$

$\therefore a^2 \sin^2 B = b^2 \sin^2 A$

$a > 0, \sin B > 0 \therefore a \sin B > 0$
 $b > 0, \sin A > 0 \therefore b \sin A > 0$

$\therefore a \sin B = b \sin A$

$\frac{\sin B}{b} = \frac{\sin A}{a}$ (3) +7

逆数をとり
 $\frac{b}{\sin B} = \frac{a}{\sin A}$

(4) (Ⅲ) ①

$a = b \frac{\sin A}{\sin B}$

$A + B + C = 180^\circ$ ①

$A = 180^\circ - (B + C)$

$\therefore \sin A = \sin \{180^\circ - (B + C)\}$
 $= \sin(B + C)$

$= \sin B \cos C + \sin C \cos B$

$\therefore a = b \frac{\sin B \cos C}{\sin B} + b \frac{\sin C \cos B}{\sin B}$

(Ⅲ) ① $\frac{\sin C}{\sin B} = \frac{c}{b} \tan A$

$a = b \cos C + c \cos B$... ①

②, ③についても同様に証明できる

(4) +7



得点 4
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