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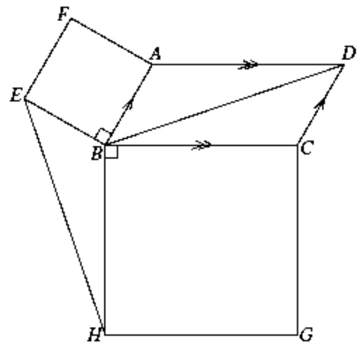
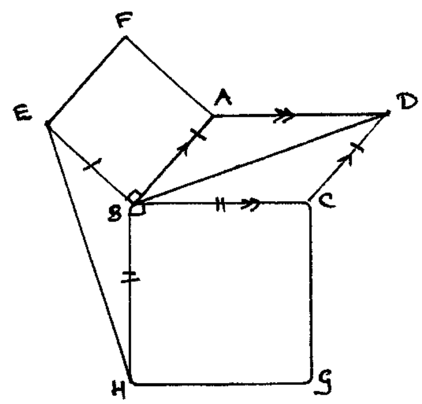
08	**8b**	In the diagram, *ABCD* is a parallelogram and ABEF and BCGH are both squares. Copy or trace the diagram into your writing booklet. (i) Prove that $CD = BE$. (ii) Prove that $BD = EH$. 	**1** **3**

i. $CD = BA$ (opp sides of parallelogram)
$BE = BA$ (sides of square BAFE)
$\therefore CD = BA$
$\therefore \Delta XYR$ is an isosceles triangle
(base $\angle$s equal)



ii. In Δs *BCD* and *EBH*:
$CD = BA$ (from i)
$BC = BH$ (sides of square *BCHG*)
Also, let $\angle BCD = x^o$
$\therefore \angle ABC = 180^o - x^o$
$\therefore \angle EBH = 360^o - (90^o + 90^o + 180^o - x^o$
$= 180^o - x^o$
$\therefore \angle ABC = \angle EBH$
$\therefore \Delta BCD \equiv \Delta EBH$ (SAS test)
$\therefore BD = EH$ (matching sides of congruent Δs)

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

The instruction to copy the diagram is designed to facilitate the use of the diagram in candidates' responses. For that reason it should be placed on the same page as the response. Candidates need to take care naming angles and triangles, and also to provide justification for every step of their reasoning. The claim that some fact is given should only be used when that fact is clearly stated as such in the data provided, and not when it has been deduced from the data. The mark value of a question is a good indication of the likely complexity of the required solution.

(i) In better responses, candidates equated both line segments to AB with appropriate reasons. Some responses first proved that triangles ABD and DCB are congruent, in order to then prove $AB = CD$ at a considerable cost in time compared to a simpler solution.

(ii) Many candidates had difficulty proving the included angles, EBH and BCD (or BAD), are equal, often falsely claiming angles were vertically opposite when they were not. The symbols for congruence and similarity were often confused. Better responses were clear, logical and concise, and many effectively used single characters as names for angles.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/