



**Problem of the Week**  
**Problem C**  
**Locate the Fourth Vertex**

Quadrilateral  $BDFH$  is constructed so that each vertex is on a different side of square  $ACEG$ . Vertex  $B$  is on side  $AC$  so that  $AB = 4$  cm and  $BC = 6$  cm. Vertex  $F$  is on  $EG$  so that  $EF = 3$  cm and  $FG = 7$  cm. Vertex  $H$  is on  $GA$  so that  $GH = 4$  cm and  $HA = 6$  cm. The area of quadrilateral  $BDFH$  is  $47 \text{ cm}^2$ .

The fourth vertex of quadrilateral  $BDFH$ , labelled  $D$ , is located on side  $CE$  so that the lengths of  $CD$  and  $DE$  are both positive integers.

Determine the lengths of  $CD$  and  $DE$ .

