Quadrilaterals Part 2

Solution

4. **(a)** $\angle BEC = 90^\circ$ (prop. of rhombus)

$BC^2 = BE^2 + EC^2$ (Pyth. thm.)

$= 15^2 + 8^2$

$BC = \sqrt{289}$

$= 17$ cm

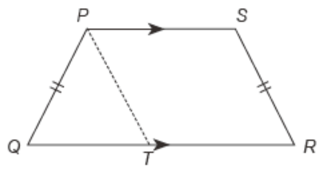
(b) perimeter $= 17 \times 4$

$= 68$ cm

area $= \dfrac{15 \times 8}{2} \times 4$

$= 240$ cm^2

5. Add a line PT by shifting the line SR such that $PSRT$ is a parallelogram.



$PT = SR$

$= PQ$

$\therefore \angle PQR = \angle PTQ$ (base $\angle$s, isos. Δ)

$= \angle SRQ$ (corr. $\angle$s, PT // SR)

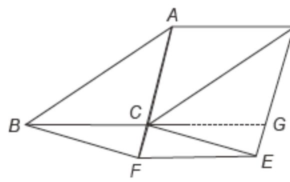
6. **(a)** Since $ABCD$ is a parallelogram, $AD = BC$ and AD // BC.

Since $BCEF$ is a parallelogram, $BC = FE$ and BC // FE.

Therefore, $AD = FE$ and AD // FE.

$ADEF$ is a parallelogram. (a pair of opp. sides equal and //)

(b) Add a point G on DE such that BCG is a straight line.



$\angle ABC = \angle DCG$ (corr. $\angle$s, AB // DC)

$\angle CBF = \angle GCE$ (corr. $\angle$s, BF // CE)

$AB = CD$

$BF = CE$

$\therefore \Delta ABF \cong \Delta DCE$ (SAS)

7. $\angle BCD = 90^\circ$ (prop. of rectangle)

$\angle DBC = 180^\circ - 90^\circ - 36^\circ$ ($\angle$ sum of Δ)

$= 54^\circ$

$\angle DBF = \angle DFB$ (base $\angle$s, isos. Δ)

$\angle DBF + \angle DFB + 36^\circ = 180^\circ$ ($\angle$ sum of Δ)

$2\angle DFB = 144^\circ$

$\angle DFB = 72^\circ$

$\angle CBF + 54^\circ = 72^\circ$

$\angle CBF = 18^\circ$

$\angle BED = \angle BFD = 72^\circ$ (opp. $\angle$s of // gram)