# CHAPTER 14

## UNDERSTANDING SHAPES
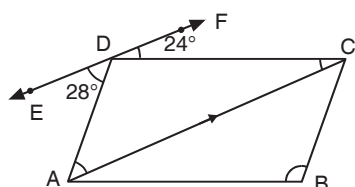
### *More Questions for Practice*

1. In Fig. 14.1, ABCD is a parallelogram, EF ∥ AC, ∠EDA = 28° and ∠CDF = 24°. Calculate:
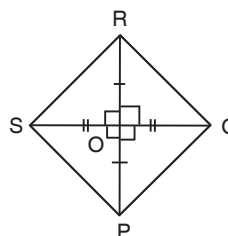
   (*i*) ∠ACD              (*ii*) ∠DAC              (*iii*) ∠ABC
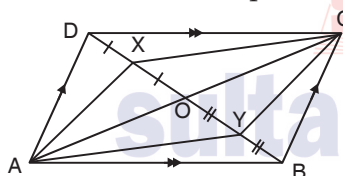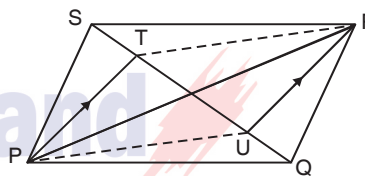
   **Fig. 14.1**

   **Fig. 14.2**

2. PQRS is a rhombus and the diagonals meet at O (See Fig. 14.2). Show that
$$PS^2 + SR^2 + RQ^2 + QP^2 = 4\,SO^2 + 4\,PO^2.$$

3. In Fig. 14.3, ABCD is a parallelogram, X is the mid-point of DO and Y is the mid-point of BO. Prove that AXCY is a parallelogram.

   **Fig. 14.3**                           **Fig. 14.4**

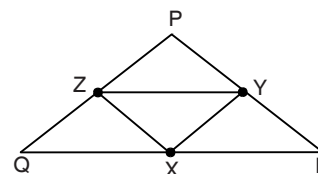4. In Fig. 14.4, PQRS is a parallelogram. PT is parallel to UR. Prove that

   (*i*) ST = QU                    (*ii*) PTRU is a parallelogram.

5. The medians BE and CF of a Δ ABC intersect at G. Show that Δ AGB, Δ BGC and Δ AGC have equal areas.

6. In Fig. 14.5, X, Y, Z are the mid-points of the sides QR, RP and PQ respectively of Δ PQR. Show that QXYZ is a ∥gm whose area is half that of Δ PQR. Also, show that

$$ar(\Delta \text{ XYZ}) = \frac{1}{4}\,ar\,(\Delta \text{ PQR}).$$

   **Fig. 14.5**

7. A quadrilateral is bisected by both its diagonals. Prove that it is a parallelogram.

8. Show that the area of a rhombus is half the product of the lengths of its diagonals.

9. In a parallelogram ABCD, AB = 10 cm, the altitudes corresponding to sides AB and AD are of lengths 7 cm and 8 cm respectively. Find the length of AD.

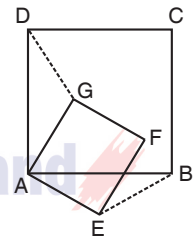**10.** In Fig. 14.6, ABCD and AEFG are squares. Prove that EB = GD.



**Fig. 14.6**

**11.** In Fig. 14.7, ABCD is a square and CDE is an equilateral triangle. Find:

   (*i*) ∠AED

  (*ii*) ∠EAB

 (*iii*) reflex ∠AEC.
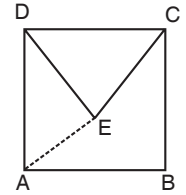


**Fig. 14.7**

**12.** In Fig. 14.8, AB ∥ DC ∥ EF, DA ∥ EB and DE ∥ AF. Prove that
$ar$ (∥gm DEFH) = $ar$ (∥gm ABCD).
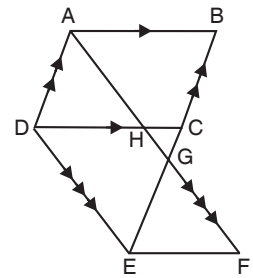


**Fig. 14.8**

## ANSWERS

**1.** (*i*) 24°     (*ii*) 28°     (*iii*) 128°

**9.** 8.75 cm

**11.** (*i*) 75°     (*ii*) 15°     (*iii*) 225°.