ANSWERS AND EXPLANATIONS

EXERCISE 1

1. (a) \( a + 36^\circ + 70^\circ = 180^\circ \) (sum of angles of triangle)
   \( \Rightarrow a = 180^\circ - 36^\circ - 70^\circ = 74^\circ \)
   
   \( b = 36^\circ + 70^\circ \) (Ext. angle of triangle) = 106^\circ
   
   \( c = a - 50^\circ \) (Ext. angle of triangle)
   \( = 74^\circ - 50^\circ = 24^\circ \).

2. (b) Since the sum of all the angle of a quadrilateral is 360\(^\circ\)
   
   We have \( \angle ABC + \angle BQE + \angle DEF + \angle EPB = 360^\circ \).
   
   \( \therefore \angle ABC + \angle DEF = 180^\circ \)
   
   \[ \therefore \text{BPE = EQB = 90}^\circ \]

3. (b) \( m \angle AHG = 180 - 108 = 72^\circ \)
   
   \( \therefore \angle AHG = \angle ABC \ldots \) (same angle with different names)
   
   \( \therefore \Delta AHG - \Delta ABC \ldots \) (AA test for similarity)

   \[ \frac{AH}{AG} = \frac{6}{9} \]
   
   \[ \frac{AB}{AC} = \frac{12}{18} \]
   
   \[ \therefore AC = \frac{12 \times 9}{6} = 18 \]

   \[ \therefore HC = AC - AH = 18 - 6 = 12 \]

4. (b) In \( \Delta ABC, \angle C = 180 - 90 - 30 = 60^\circ \)
   
   \( \therefore \angle DCE = \frac{60}{2} = 30^\circ \)
   
   Again in \( \Delta DEC, \angle CED = 180 - 90 - 30 = 60^\circ \)

5. (c) In a right angled \( \Delta \), the length of the median is \( \frac{1}{2} \)
   
   the length of the hypotenuse. Hence
   
   \[ BD = \frac{1}{2} AC = 3 \text{cm.} \]

6. (a) \( \angle D = 180 - \angle B = 180 - 70 = 110^\circ \)
   
   \( \therefore \angle ACD = 180 - \angle D - \angle CAD \)
   
   \( 180 - 110 - 30 = 40^\circ \)

7. (b) \( \text{ABCD is square } a^2 = 4 \Rightarrow a = 2 \)
   
   \( ac = BD = 2\sqrt{2} \)
   
   perimeters of four triangles
   
   \( = AB + BC + CD + DA + 2(AC + BD) \)
   
   \( = 8 + 2(2\sqrt{2} + 2\sqrt{2}) = 8(1 + \sqrt{2}) \)

8. (d) The quadrilateral obtained will always be a trapezium as it has two lines which are always parallel to each other.

9. (b) It is a rectangle.
   
   (In a cyclic parallelogram each angle is equal to 90°. So, it is definitely either a square or a rectangle. Since the given cyclic parallelogram has unequal adjacent sides, it is a square.)

10. (a)