1. (i) What is the sum of the interior angles of a decagon (10-sided polygon)?
   (ii) Calculate the measure of each interior angle of a regular hexagon,
   (iii) What is each exterior angle of a regular pentagon?
   (iv) If the sum of the interior angles of a polygon is 1260°, how many sides does the polygon have?

Sol: Interior angle of regular inside diagonals $\frac{n(x-3)}{2}$)

Polygon $= \frac{180(x-2)}{n}$

Exterior angle $= \frac{360}{n}$

Where n is the number of rides

(i) $x = 10$ Interior angle $= \frac{(10-2)180}{10} = 144°$

Sum of all interior angles $= 1440°$

(ii) Hexagon n = 6 Each interior angle $= \frac{(6-2)180}{6}$

$= \frac{\overset{30}{180} \times 4}{6} = 120°$

(iii) Pentagon   n = 5

Exterior angle $= \frac{360}{5} = 72°$

(iv) Total sum of interior angle = 1260°

∴   No. of sides $= (n-2)180°$

if n, then total sum $(n-2)180 = 1260$

$n - 2 = \frac{126\cancel{0}^{7}}{\cancel{180}_{1}}$: n = 7 + 2 = 9
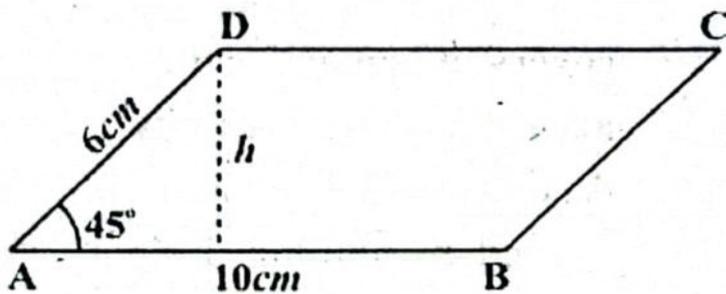
nine sided polygon. ·

2. In a parallelogram $ABCD$, $m\overline{AB} = 10$ cm, $m\overline{AD} = 6$ cm and $m\angle BAD = 45°$. Calculate the area of $ABCD$.

Sol:
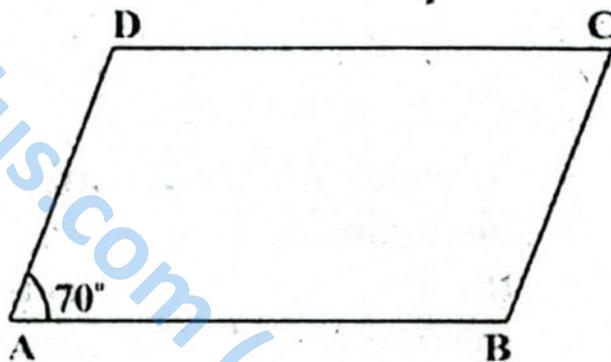
$$\frac{h}{6} = \sin 45°$$

$$h = \frac{6}{\sqrt{2}}$$

$$\text{Area} = 10 \times \frac{6}{\sqrt{2}} = \frac{30 \times \left(\sqrt{2}\right)^2}{\sqrt{2}}$$

$$= 30\sqrt{2}$$

3. In a parallelogram $ABCD$ if $m\angle DAB = 70°$, find the measures of all other angles in the parallelogram.

Sol: $\angle A = 70°$

$\angle C = $ opposite vertex $= 70°$
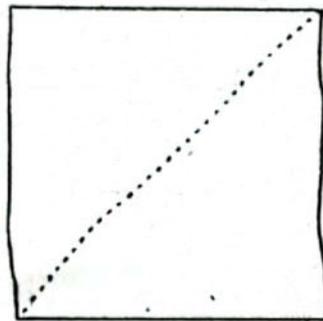
$\angle A + \angle B = 180$ $\therefore$ $\angle B = \angle D = 180 - 70$

$\angle B = 110°$

4. A shape is created by cutting a square in half diagonally and then attaching a right-angled triangle to the hypotenuse of each half. Explain why this shape can tessellate and calculate the interior angle of the new shape.

Sol: Each half is again a right angle triangle. Hence, tessellate. a unit of 4 squares. Each joint of four covers $360°$.

5. A tessellation is created by repeatedly reflecting a basic shape. The basic shape is a right-angled triangle with sides of length 3, 4, and 5 units. Find: The minimum number of reflections needed to create a tessellation that covers a square with an area of 3600 square units.

Sol: A unit of Tessellation is formed by joining 4 right angled Δs as shown in the diagram.
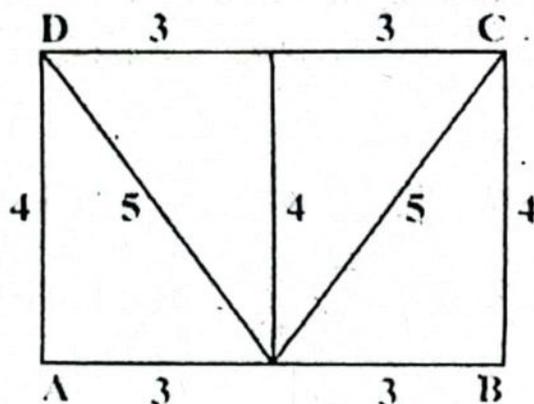
Total area of one unit $= 6m \times 4$ unit^2

$\qquad\qquad\qquad = 24$ unit^2

Total area $= 3600$ unit square

$$\text{No. of units} = \frac{3600}{24} = 150$$

No. of tessellation tiles $= 150 \times 4 = 600$

6. A tessellation is created using regular hexagons. Each hexagon has a side length of 5cm. Find the total area of the tessellation if it consists of 25 hexagons and total perimeter of the outer edge of the tessellation, assuming it's a perfect hexagon.

Sol: Area of a regular polygon of 6 sides (Hexagon) of side length $a = \dfrac{3\sqrt{3}a^-}{2}$

Side $= a = 5$cm

Area of 1 unit $= \dfrac{3\sqrt{3} \times 25}{2} = \dfrac{75 \times \sqrt{3}}{2}$

Area of 25 units $= \dfrac{75 \times \sqrt{3} \times 25}{2}$

$\qquad\qquad\qquad = \dfrac{187.5 \times 1.732}{2}$

$$= 1875 \times .866 \text{ sq. cm}$$
$$= 1623.75 \text{ } cm^2$$

Side of the big hexagon ℓ

$$\ell^2 = \frac{\text{Area} \times 2}{3\sqrt{3}} = \frac{1623.75 \times 2}{2 \times 1.732}$$

$$\ell^2 = 937.5$$

One side $\ell = 30.62 cm$

7. **A rectangular floor is 12m by 15m. How many square tiles, each 1m by 1m, are needed to cover the floor?**

Sol: Area of Rectangular floor $= 12m \times 15m$

$$= 180 \text{ } m^2$$

Area of each role $= 1m \times 1m = 1 m^2$

Number of tile $= \dfrac{180}{1} = 180$

8. **A rectangular wall is 10m tall and 120m wide. How many gallons of paint are needed to cover the wall, if one gallon covers 35m²?**

Sol: Area of the wall $= 10 \times 120 = 1200m$

Area covered by 1 gallon of petrol $= 35 \text{ m}^2$

Total no. of gallon of paints $= \dfrac{1200}{35} = 34.29$

Hence, 35 gallon of paint is the requirement.

9. **A rectangular wall has a length of 10 m and a width of 4 meters. If 1 litre of paint covers 7 m², how many liters of paint are needed to cover the wall?**

Sol: Area of wall $= 10 \times 4 = 40 \text{ m}^2$

Paint for $1m^2$ wall $= 7$ litres

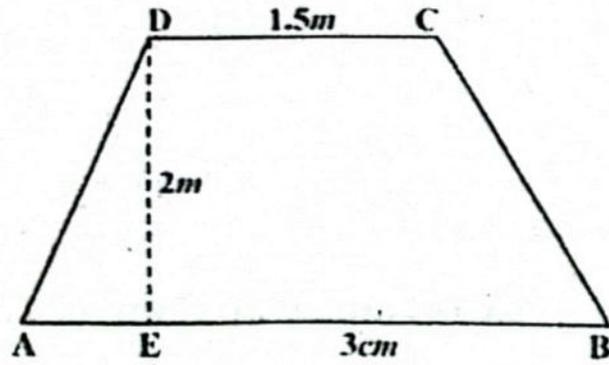Paint requirement $= \dfrac{40}{7} = 5.7$ litres

or $50 \text{ y} = 6$ lit.

10. A window has a trapezoidal shape with parallel sides of 3*m* and 1.5*m* and a height of 2*m*. Find the area of the window.

Sol:

Area of the glass $= \left(\dfrac{3+1.5}{2}\right) \times 2$

$= 4.5$ Sq.m.