



Exercise 18B

Q1.

Answer :

$$\begin{aligned}
 \text{Area of quadrilateral ABCD} &= (\text{Area of } \triangle ADC) + (\text{Area of } \triangle ACB) \\
 &= \left(\frac{1}{2} \times AC \times DM \right) + \left(\frac{1}{2} \times AC \times BL \right) \\
 &= \left[\left(\frac{1}{2} \times 24 \times 7 \right) + \left(\frac{1}{2} \times 24 \times 8 \right) \right] \text{ cm}^2 \\
 &= (84 + 96) \text{ cm}^2 \\
 &= 180 \text{ cm}^2
 \end{aligned}$$

Hence, the area of the quadrilateral is 180 cm^2 .

Q2.

Answer :

$$\begin{aligned}
 \text{Area of quadrilateral ABCD} &= (\text{Area of } \triangle ABD) + (\text{Area of } \triangle BCD) \\
 &= \left(\frac{1}{2} \times BD \times AL \right) + \left(\frac{1}{2} \times BD \times CM \right) \\
 &= \left[\left(\frac{1}{2} \times 36 \times 19 \right) + \left(\frac{1}{2} \times 36 \times 11 \right) \right] \text{ m}^2 \\
 &= (342 + 198) \text{ m}^2 \\
 &= 540 \text{ m}^2
 \end{aligned}$$

Hence, the area of the field is 540 m^2 .

Q3.

Answer :

$$\begin{aligned}
 \text{Area of pentagon ABCDE} &= (\text{Area of } \triangle AEN) + (\text{Area of trapezium EDMN}) \\
 &\quad + (\text{Area of } \triangle DMC) + (\text{Area of } \triangle ACB) \\
 &= \left(\frac{1}{2} \times AN \times EN \right) + \left(\frac{1}{2} \times (EN + DM) \times NM \right) + \left(\frac{1}{2} \times MC \times DM \right) + \left(\frac{1}{2} \times AC \times BL \right) \\
 &= \left(\frac{1}{2} \times AN \times EN \right) + \left(\frac{1}{2} \times (EN + DM) \times (AM - AN) \right) + \left(\frac{1}{2} \times (AC - AM) \times DM \right) \\
 &\quad + \left(\frac{1}{2} \times AC \times BL \right) \\
 &= \left[\left(\frac{1}{2} \times 6 \times 9 \right) + \left(\frac{1}{2} \times (9 + 12) \times (14 - 6) \right) + \left(\frac{1}{2} \times (18 - 14) \times 12 \right) + \left(\frac{1}{2} \times 18 \times 4 \right) \right] \\
 &\quad \text{cm}^2 \\
 &= (27 + 84 + 24 + 36) \text{ cm}^2 \\
 &= 171 \text{ cm}^2
 \end{aligned}$$

Hence, the area of the given pentagon is 171 cm^2 .

Q4.

Answer :

$$\begin{aligned}
 \text{Area of hexagon ABCDEF} &= (\text{Area of } \triangle AFP) + (\text{Area of trapezium FENP}) \\
 &+ (\text{Area of } \triangle ALB) \\
 &= \left(\frac{1}{2} \times AP \times FP\right) + \left(\frac{1}{2} \times (FP + EN) \times PN\right) + \left(\frac{1}{2} \times ND \times EN\right) + \left(\frac{1}{2} \times MD \times CM\right) \\
 &+ \left(\frac{1}{2} \times (CM + BL) \times LM\right) + \left(\frac{1}{2} \times AL \times BL\right) \\
 &= \left(\frac{1}{2} \times AP \times FP\right) + \left(\frac{1}{2} \times (FP + EN) \times (PL + LN)\right) + \left(\frac{1}{2} \times (NM + MD) \times CM\right) \\
 &+ \left(\frac{1}{2} \times MD \times CM\right) + \left(\frac{1}{2} \times (CM + BL) \times (LN + NM)\right) + \left(\frac{1}{2} \times (AP + PL) \times BL\right) \\
 &= \left[\left(\frac{1}{2} \times 6 \times 8\right) + \left(\frac{1}{2} \times (8 + 12) \times (2 + 8)\right) + \left(\frac{1}{2} \times (2 + 3) \times 12\right) + \left(\frac{1}{2} \times 3 \times 6\right) \right. \\
 &\left. + \left(\frac{1}{2} \times (6 + 8) \times (8 + 2)\right) + \left(\frac{1}{2} \times (6 + 2) \times 8\right)\right] \text{ cm}^2 \\
 &= (24 + 100 + 30 + 9 + 70 + 32) \text{ cm}^2 \\
 &= 265 \text{ cm}^2
 \end{aligned}$$

Hence, the area of the hexagon is 265 cm^2 .

Q5.

Answer :

$$\begin{aligned}
 \text{Area of pentagon ABCDE} &= (\text{Area of } \triangle ABC) + (\text{Area of } \triangle ACD) \\
 &+ (\text{Area of } \triangle ADE) \\
 &= \left(\frac{1}{2} \times AC \times BL\right) + \left(\frac{1}{2} \times AD \times CM\right) + \left(\frac{1}{2} \times AD \times EM\right) \\
 &= \left[\left(\frac{1}{2} \times 10 \times 3\right) + \left(\frac{1}{2} \times 12 \times 7\right) + \left(\frac{1}{2} \times 12 \times 5\right)\right] \text{ cm}^2 \\
 &= (15 + 42 + 30) \text{ cm}^2 \\
 &= 87 \text{ cm}^2
 \end{aligned}$$

Hence, the area of the pentagon is 87 cm^2 .

Q6.

Answer :

$$\begin{aligned}
 \text{Area enclosed by the given figure} &= (\text{Area of trapezium FEDC}) \\
 &+ (\text{Area of square ABCF}) \\
 &= \left[\left\{\frac{1}{2} \times (6 + 20) \times 8\right\} + (20 \times 20)\right] \text{ cm}^2 \\
 &= (104 + 400) \text{ cm}^2 \\
 &= 504 \text{ cm}^2
 \end{aligned}$$

Hence, the area enclosed by the figure is 504 cm^2 .

Q7.

Answer :

We will find the length of AC.

From the right triangles ABC and HGF, we have :

$$\begin{aligned}
 AC^2 &= HF^2 = \{(5)^2 - (4)^2\} \text{ cm} \\
 &= (25 - 16) \text{ cm} \\
 &= 9 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 AC &= HF = \sqrt{9} \text{ cm} \\
 &= 3 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of the given figure ABCDEFGH} &= (\text{Area of rectangle ADEH}) \\
 &+ (\text{Area of } \triangle ABC) + (\text{Area of } \triangle HGF) \\
 &= (\text{Area of rectangle ADEH}) + 2(\text{Area of } \triangle ABC) \\
 &= (AD \times DE) + 2(\text{Area of } \triangle ABC) \\
 &= \{(AC + CD) \times DE\} + 2\left(\frac{1}{2} \times BC \times AC\right) \\
 &= \{(3 + 4) \times 8\} + 2\left(\frac{1}{2} \times 4 \times 3\right) \text{ cm}^2 \\
 &= (56 + 12) \text{ cm}^2 \\
 &= 68 \text{ cm}^2
 \end{aligned}$$

Hence, the area of the given figure is 68 cm^2 .

Q8.

Answer :

Let $AL = DM = x$ cm

$LM = BC = 13$ cm

$\therefore x + 13 + x = 23$

$\Rightarrow 2x + 13 = 23$

$\Rightarrow 2x = (23 - 13)$

$\Rightarrow 2x = 10$

$\Rightarrow x = 5$

$\therefore AL = 5$ cm

From the right $\triangle AFL$, we have :

$$FL^2 = AF^2 - AL^2$$

$$\Rightarrow FL^2 = \left\{ (13^2) - (5)^2 \right\}$$

$$\Rightarrow FL^2 = (169 - 25)$$

$$\Rightarrow FL^2 = 144$$

$$\Rightarrow FL = \sqrt{144}$$

$$\Rightarrow FL = 12 \text{ cm}$$

$\therefore FL = BL = 12$ cm

Area of a regular hexagon = (Area of *the* trapezium ADEF)

Area of a regular hexagon = (Area of *the* trapezium ADEF)

+ (Area of *the* trapezium ABCD)

$$= 2(\text{Area of trapezium ADEF})$$

$$= 2 \left\{ \frac{1}{2} \times (AD + EF) \times FL \right\}$$

$$= 2 \left\{ \frac{1}{2} \times (23 + 13) \times 12 \right\} \text{cm}^2$$

$$= 2 \left(\frac{1}{2} \times 36 \times 12 \right) \text{cm}^2$$

$$= 432 \text{ cm}^2$$

Hence, the area of the given regular hexagon is 432 cm^2 .

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