Exercise 20D

Q20

Answer :

First, we have to find the area of ΔABC and ΔACD.

For ΔACD:

Let a = 30 cm, b = 40 cm and c = 50 cm

$s = \left(\frac{a+b+c}{2}\right) = \left(\frac{30+40+50}{2}\right) = \left(\frac{120}{2}\right) = 60$ cm

∴ Area of triangle ACD = $\sqrt{s(s-a)(s-b)(s-c)}$ sq. units

$= \sqrt{60(60-30)(60-40)(60-50)}$ cm^2

$= \sqrt{60 \times 30 \times 20 \times 10}$ cm^2

$= \sqrt{360000}$ cm^2

= 600 cm^2

For ΔABC:

Let a = 26 cm, b = 28 cm and c = 30 cm

$s = \left(\frac{a+b+c}{2}\right) = \left(\frac{26+28+30}{2}\right) = \left(\frac{84}{2}\right) = 42$ cm

∴ Area of triangle ABC = $\sqrt{s(s-a)(s-b(s-c))}$ sq. units

$= \sqrt{42(42-26)(42-28)(42-30)}$ cm^2

$= \sqrt{42 \times 16 \times 14 \times 12}$ cm^2

$= \sqrt{2 \times 3 \times 7 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 3 \times 2 \times 2}$ cm^2

= (2 ×2 × 2 × 2 × 3 × 7) cm^2

= 336 cm^2

∴ Area of the given quadrilateral ABCD = Area of ΔACD + Area of ΔABC

= (600 + 336) cm^2 = 936 cm^2

Q21

Answer :

Area of the rectangle = AB × BC

= 36 m × 24 m

= 864 m^2

Area of the triangle $= \frac{1}{2} \times AD \times FE$

$= \frac{1}{2} \times BC \times FE$ [since AD = BC]

$= \frac{1}{2} \times 24\ m \times 15\ m$

$= 12\ m \times 15\ m = 180\ m^2$

∴ Area of the shaded region = Area of the rectangle − Area of the triangle

$= (864 - 180)\ m^2$

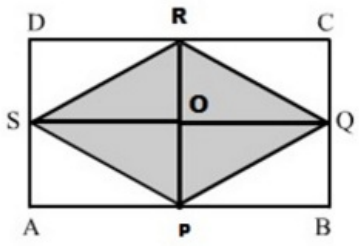
$= 684\ m^2$

Q22

Answer :

Join points *PR* and *SQ*.

These two lines bisect each other at point *O*.



Here, *AB* = *DC* = *SQ* = 40 cm

AD = *BC* =*RP* = 25 cm

Also, $OP = OR = \frac{RP}{2} = \frac{25}{2} = 12.5$ cm

From the figure we observe:

Area of Δ*SPQ* = Area of Δ*SRQ*

∴ Area of the shaded region $= 2 \times$ (Area of Δ*SPQ*)

$= 2 \times (\frac{1}{2} \times SQ \times OP)$

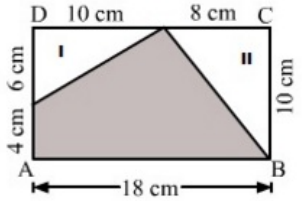
$= 2 \times (\frac{1}{2} \times 40\ cm \times 12.5\ cm)$

$= 500\ cm^2$

Q23

Answer :

(i) Area of rectangle ABCD = (10 cm x 18 cm) = 180 cm^2

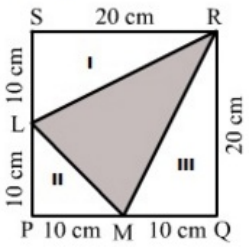


Area of triangle I = $\left(\frac{1}{2} \times 6 \times 10\right)$ cm^2 = 30 cm^2

Area of triangle II = $\left(\frac{1}{2} \times 8 \times 10\right)$ cm^2 = 40 cm^2

∴ Area of the shaded region = {180 - (30 + 40)} cm^2 = { 180 - 70}cm^2 = 110 cm^2

(ii) Area of square ABCD = $(Side)^2 = (20\ cm)^2 = 400\ cm^2$



Area of triangle I = $\left(\frac{1}{2} \times 10 \times 20\right)$ cm^2 = 100 cm^2

Area of triangle II = $\left(\frac{1}{2} \times 10 \times 10\right)$ cm^2 = 50 cm^2

Area of triangle III = $\left(\frac{1}{2} \times 10 \times 20\right)$ cm^2 = 100 cm^2

∴ Area of the shaded region = {400 - (100 + 50 + 100)} cm^2 = { 400 - 250}cm^2 = 150 cm^2

Q24

Answer :

Let ABCD be the given quadrilateral and let BD be the diagonal such that BD is of the length 24 cm.

Let AL ⊥ BD and CM ⊥ BD

Then, AL = 5 cm and CM = 8 cm

Area of the quadrilateral ABCD = (Area of ΔABD + Area of ΔCBD)

$$= \left[\left(\frac{1}{2} \times BD \times AL\right) + \left(\frac{1}{2} \times BD \times CM\right)\right] \text{ sq. units}$$

$$= \left[\left(\frac{1}{2} \times 24 \times 5\right) + \left(\frac{1}{2} \times 24 \times 8\right)\right] cm^2$$

= (60 + 96) cm^2 = 156 cm^2

∴ Area of the given quadrilateral = 156 cm

********** END **********