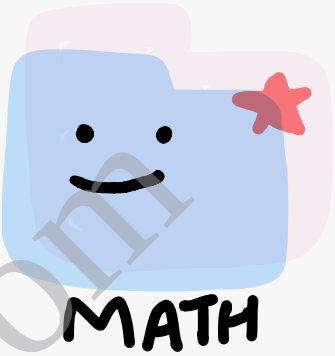
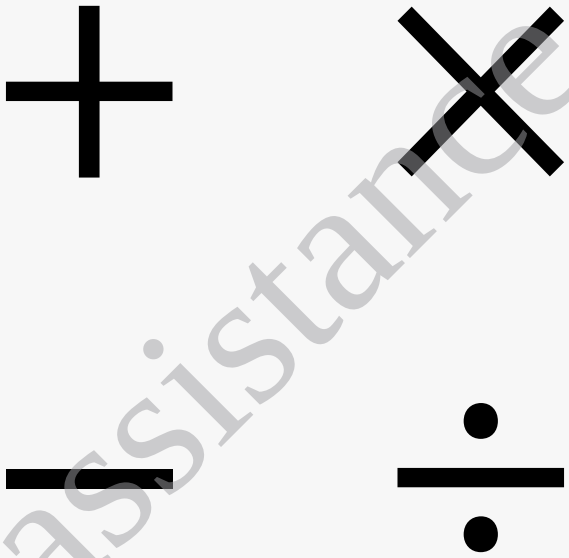
Mensuration
Ex. 9.1





Ex. 9.1

1. Length of diagonal = 28 cm
Length of offsets = 9 cm and 13 cm
Area of quadrilateral
$= \frac{1}{2} \times$ diagonal $\times$ sum of offsets
$= \frac{1}{\cancel{2}_1} \times \cancel{28}^{14} \times (9+13)$
$= 14 \times 22$
$= 308 \text{ cm}^2$

2. Length of diagonal AC = 16 cm
Length of offsets = 6 cm and 7 cm
Area of quadrilateral
$= \frac{1}{2} \times$ diagonal $\times$ sum of offsets
$= \frac{1}{\cancel{2}_1} \times \cancel{16}^{8} \times (6+7)$
$= 8 \times 13$
$= 104 \text{ cm}^2$

3. In $\square PQRS$, $PR = 20$ m
Length of perpendicular from Q on PR = 8 m
Let length of perpendicular from S on PR = x m
Area of $\square PQRS = 150$ sq. m
or $\frac{1}{\cancel{2}_1} \times \cancel{20}^{10} \times (8+x) = 150$
or $10(8+x) = 150$
or $8+x = \frac{150}{10}$

or $x = 15 - 8$

or $x = 7$

$\therefore$ Length of perpendicular from S on PR $= 7$ m

4. Side of regular hexagon, $a = 10$ cm

Area of regular hexagon $= \frac{3\sqrt{3}}{2} a^2$

$= \frac{3 \times 1.73}{2} \times (10)^2$

$= \frac{5.19 \times 100}{2}$

$= \frac{519}{2}$

$= 259.5 \text{ cm}^2$

5. Side of regular octagon, $a = 7$ cm

Area of regular octagon $= 2(1+\sqrt{2}) a^2$

$= 2(1 + 1.4) \times 7^2$

$= 2 \times 2.4 \times 49$

$= 235.2 \text{ cm}^2$

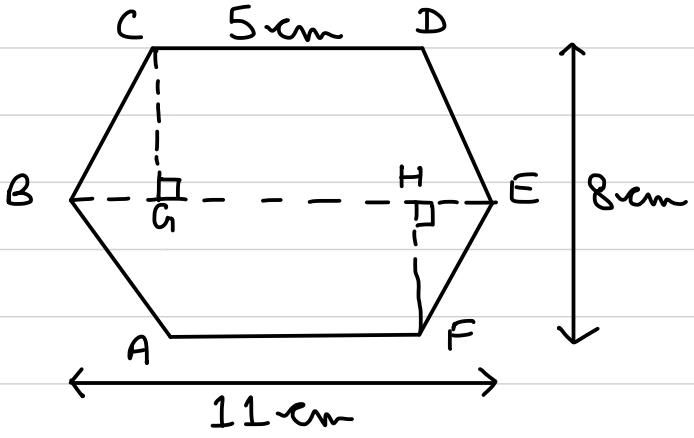
6. Const. - Join BE and draw CG and FH perpendiculars on BE.

In hexagon ABCDEF,

$CG = 4$ cm, $HF = 4$ cm,

$CD = 5$ cm, $BE = 11$ cm,

$AF = 5$ cm



Area of hexagon ABCD

$= $ area of trapezium BCDE + area of trapezium ABEF

$= \frac{1}{2}(CD+BE)\times CG + \frac{1}{2}(AF+BE)\times FH$

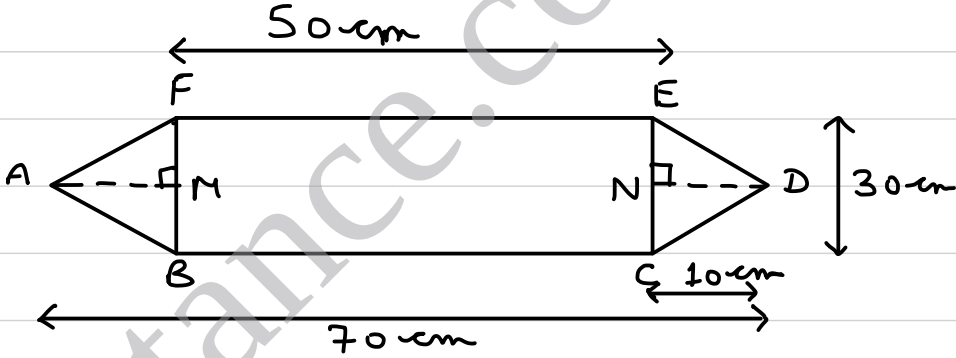
$= \frac{1}{\cancel{2}_1}(5+11)\times \cancel{4}^{2} + \frac{1}{\cancel{2}_1}(5+11)\times 4^{2}$

$= 16\times 2 + 16\times 2$

$= 32 + 32$

$= 64 \text{ cm}^2$

7. Const:- Draw AM ⊥ BF and DN ⊥ CE.



BC = FE = 50 cm

BF = CE = 30 cm

DN = 10 cm

AM = 70 − (50 + 10) = 70 − 60 = 10 cm

Area of polygon ABCDEF

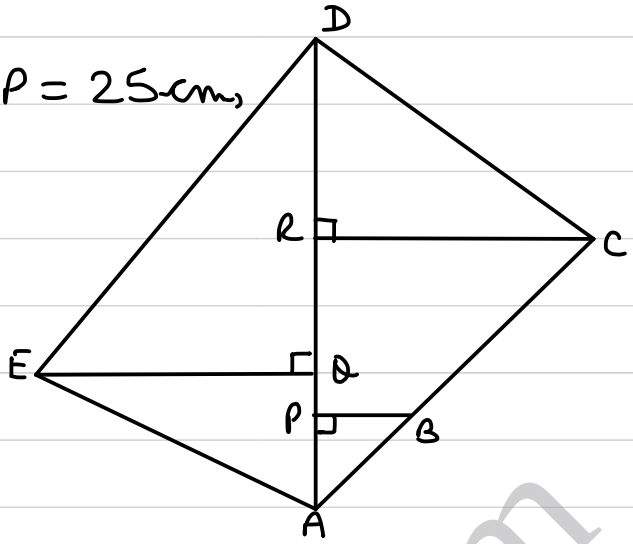
$= $ area of rectangle BCEF + area of $\triangle$ABF + area of $\triangle$CDE

$= 50\times 30 + \frac{1}{\cancel{2}_1}\times \cancel{30}^{15}\times 10 + \frac{1}{\cancel{2}_1}\times \cancel{30}^{15}\times 10$

$= 1500 + 150 + 150$

$= 1800 \text{ cm}^2$

8. In pentagon ABCDE, AP = 25 cm, PQ = 15 cm, QR = 40 cm, RD = 56 cm, BP = 20 cm, EQ = 60 cm, RC = 52 cm



$AD = AP + PQ + QR + RD$

$= 25 + 15 + 40 + 56$

$= 136$ cm

$PR = PQ + QR$

$= 15 + 40$

$= 55$ cm

Area of $\Delta ADE = \frac{1}{2} \times AD \times QE$

$= \frac{1}{\cancel{2}_{1}} \times 136 \times \cancel{60}^{30}$

$= 4080$ cm^2

Area of $\Delta CDR = \frac{1}{2} \times DR \times CR$

$= \frac{1}{2} \times 56 \times \cancel{52}^{26}$

$= 1456$ cm^2

Area of $\Delta ABP = \frac{1}{2} \times AP \times BP$

$= \frac{1}{\cancel{2}_{1}} \times 25 \times \cancel{20}^{10}$

$= 250$ cm^2

Area of trapezium $BCRP = \frac{1}{2} \times (BP + RC) \times PR$

$= \frac{1}{2} \times (20 + 52) \times 55$

$= \frac{1}{\cancel{2}_1} \times \overset{36}{\cancel{72}} \times 55$

$= 1980 \text{ cm}^2$

$\therefore$ Area of pentagon ABCDE

= area of $\triangle ADE$ + area of $\triangle CDR$ + area of $\triangle ABP$ + area of trapezium BCRP

$= 4080 + 1456 + 250 + 1980$

$= 7766 \text{ cm}^2$