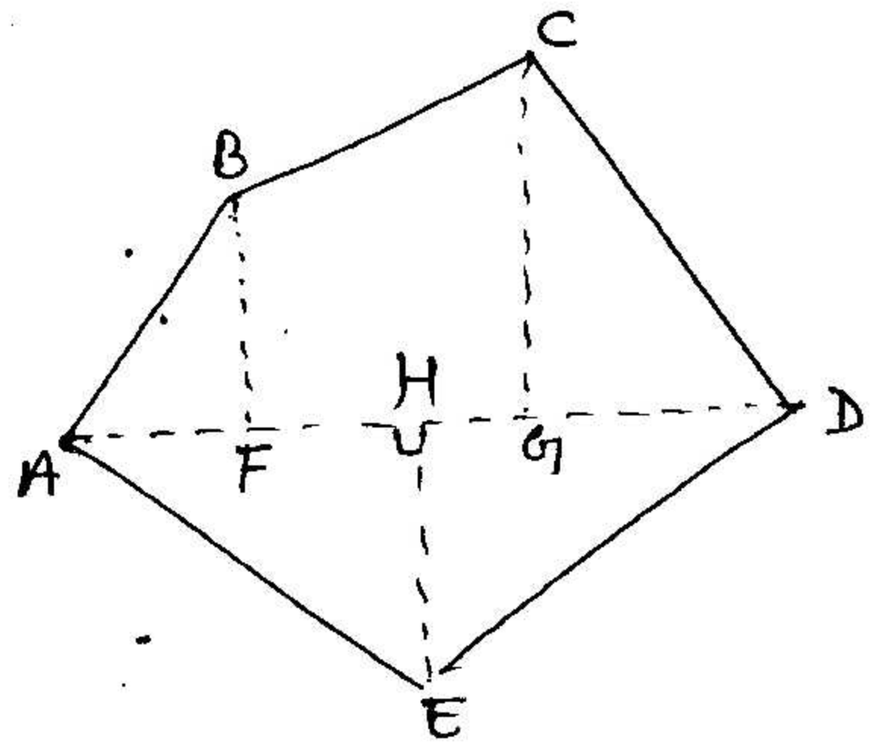
Exercise 20.3

Q.1 Find the area of the pentagon if $AD = 10$ cm

$AG = 8$ cm, $AH = 6$ cm, $AF = 5$ cm, $BF = 5$ cm, $CG = 7$ cm

$EH = 3$ cm



Sol:

$Ar(\Delta ABF) = \frac{1}{2} \times AF \times BF$

$= \frac{1}{2} \times 5 \times 5 = \frac{25}{2}$ cm^2

$= 12.5$ cm^2

$Ar(BCGF) = \frac{1}{2}$ ~~$(BF+CG)$~~ FG

$= \frac{1}{2} \times (5+7)(AG-AF) = \frac{1}{2} \times 12 \times 3 = 18$ cm^2

$Ar(\Delta GCD) = \frac{1}{2} \times GD \times GC = \frac{1}{2}(AD-AG) \times GC$

$= \frac{1}{2} \times (10-8) \times 7$

$= \frac{1}{2} \times 2 \times 7 = 7$ cm^2

$Ar(\Delta HED) = \frac{1}{2} \times HD \times HE$

$= \frac{1}{2} \times (AD-AH) \times HE$

$= \frac{1}{2} \times (10-6) \times 3 = \frac{1}{2} \times 4 \times 3 = 6$ cm^2

$Ar(\Delta AHE) = \frac{1}{2} \times AH \times HE = \frac{1}{2} \times 6 \times 3 = 9$ cm^2

Total area $= 12.5 + 18 + 7 + 6 + 9$

$= 52.5$ cm^2

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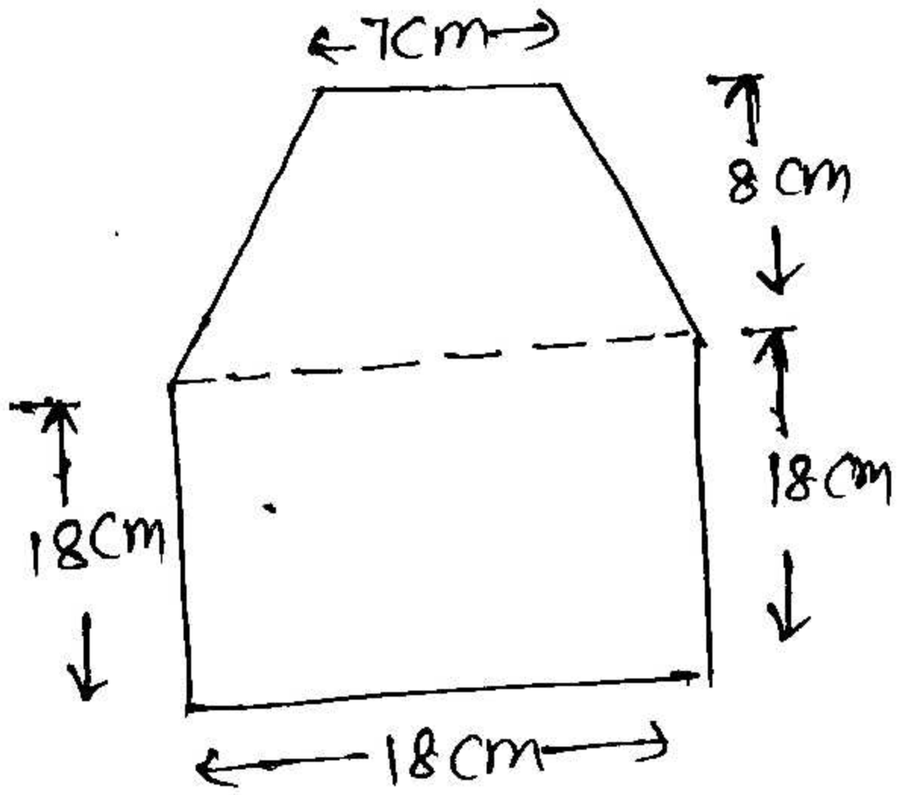
Q2 Find the area enclosed by each of the following figures as the sum of the areas of rectangle and a trapezium.



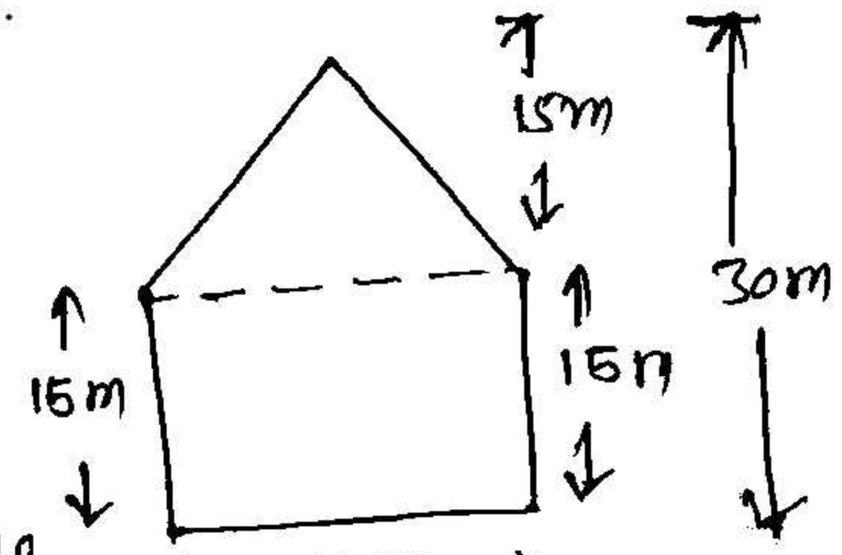
Sol: Area of Trap $= \frac{1}{2} \times (7+18) \times 8 = 25 \times 4 = 100\ cm^2$

Area of rectagle $= 18 \times 18 = 324\ cm^2$

Total area of figure $= 324 + 100$

$= 424\ cm^2$

Q3 There is a pentagonal shaped park as shown in fig. Jyoti and Kavita divided it in two different ways.



Sol:

According to Kavita

A = Area of Triagle + Ar of Square

$= \frac{1}{2} \times 15 \times 15 + 15 \times 15$

$= \frac{225}{2} + 225 = 112.5 + 225$

$= Rs\ 337.5\ cm^2$

Kavita's

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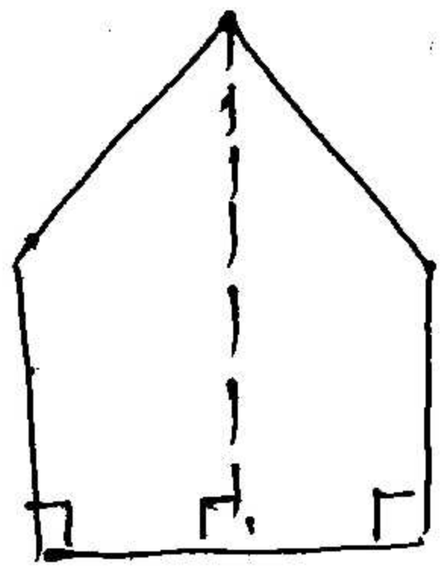
Accordy to Jyoti"

$A = 2$ [Area of trapezium]

$= 2 \times \frac{1}{2}(15+30) \times \frac{15}{2}$

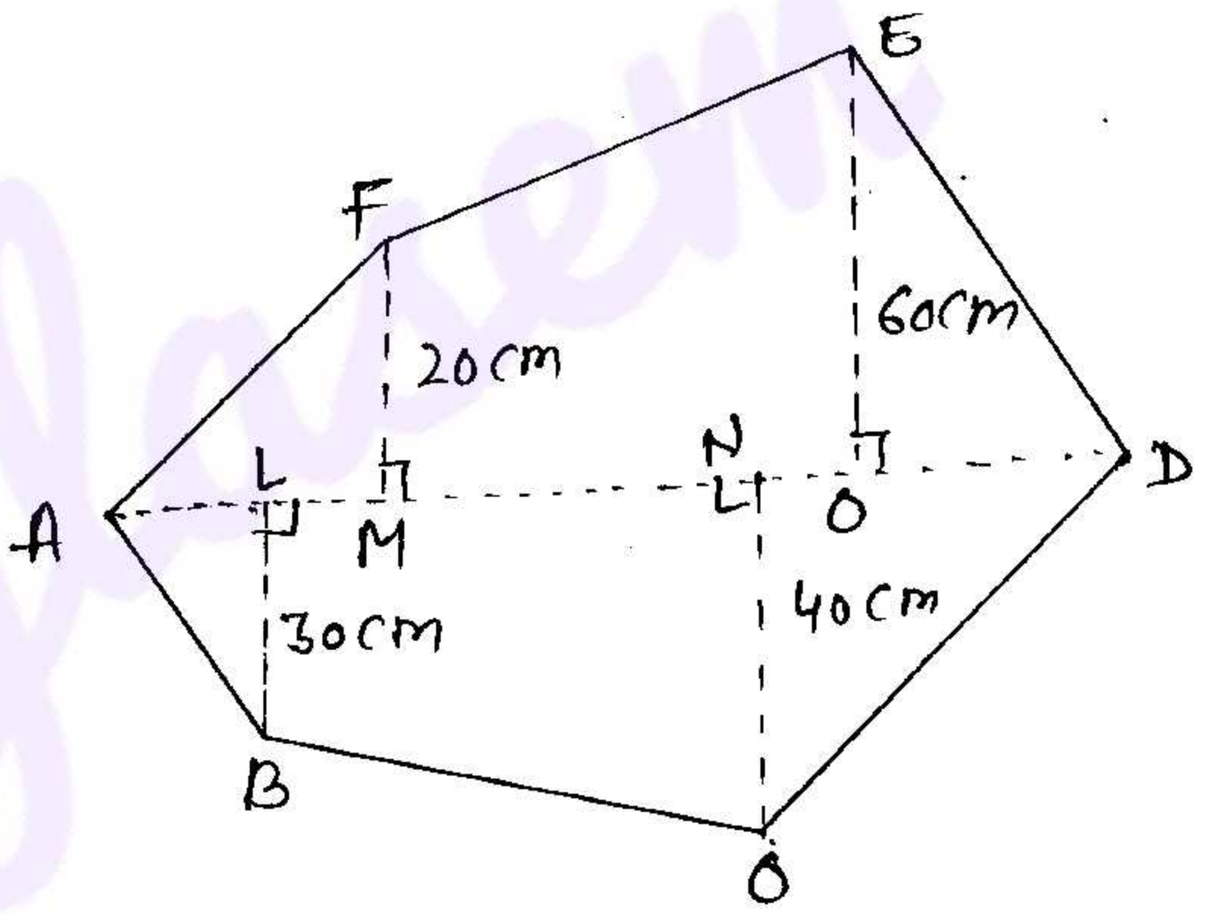
$= 45 \times \frac{15}{2} = 337.5 \text{ cm}^2$



Jyoti's

Q.4 Find the area of the following polygon, if AL = 10 cm, AM = 20 cm, AN = 50 cm, AO = 60 cm, AD = 90 cm.

Sol:



Ar(Δ AFM)

$= \frac{1}{2} \times AM \times FM$

$= \frac{1}{2} \times 20 \times 20$

$= 200 \text{ cm}^2$

Ar(trap FMOE)

$= \frac{1}{2} \times (FM + OE) \times (OM)$

$= \frac{1}{2}(20+60) \times (AO - AM)$

$= \frac{1}{2} \times 80 \times (60-20) = \frac{1}{2} \times 80 \times 40 = 1600 \text{ cm}^2$

$Ar(\Delta OED) = \frac{1}{2} \times OD \times OE = \frac{1}{2} \times (AD - AO) \times OE$

$= \frac{1}{2}(90-60) \times 60 = \frac{1}{2} \times 30 \times 60$

$= 900 \text{ cm}^2$

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$ar(\Delta OCN) = \frac{1}{2} \times DN \times CN$

$= \frac{1}{2} \times (AD - AN) \times 40$

$= \frac{1}{2} \times (90 - 50) \times 40 = \frac{1}{2} \times 40 \times 40$

$= 800\ cm^2$

$Ar(\Delta BCNL) = \frac{1}{2} \times (BL + CN) \times (LN)$

$= \frac{1}{2} (30 + 40) \times (AN - AL)$

$= \frac{1}{2} \times 70 \times (50 - 10) = \frac{1}{2} \times 70 \times 40$

$= 1400\ cm^2$

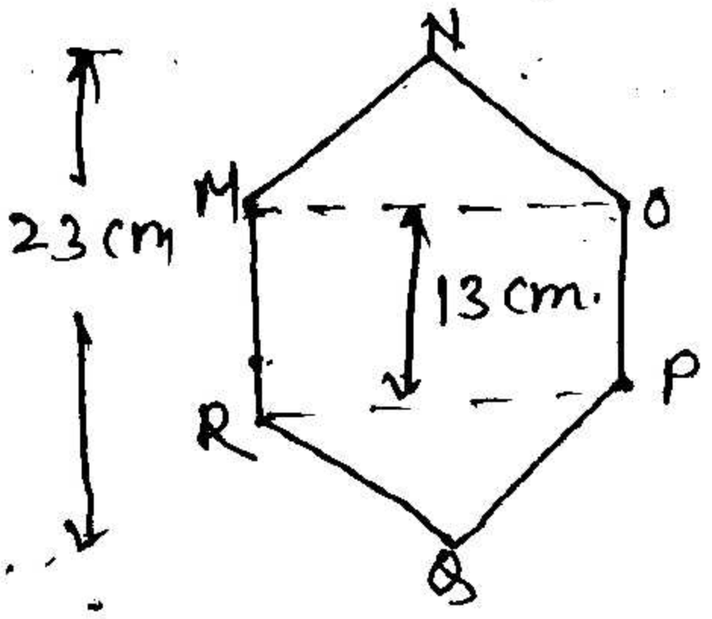
$ar(\Delta ABL) = \frac{1}{2} \times AL \times BL$

$= \frac{1}{2} \times 10 \times 30 = 150\ cm^2$

Total area $= 200 + 1600 + 900 + 800 + 1400 + 150$

$= 5050\ cm^2$

Q.5 Find the area of the following regular hexagon.



Sol. height of $\Delta = \frac{23 - 13}{2} = 5cm$

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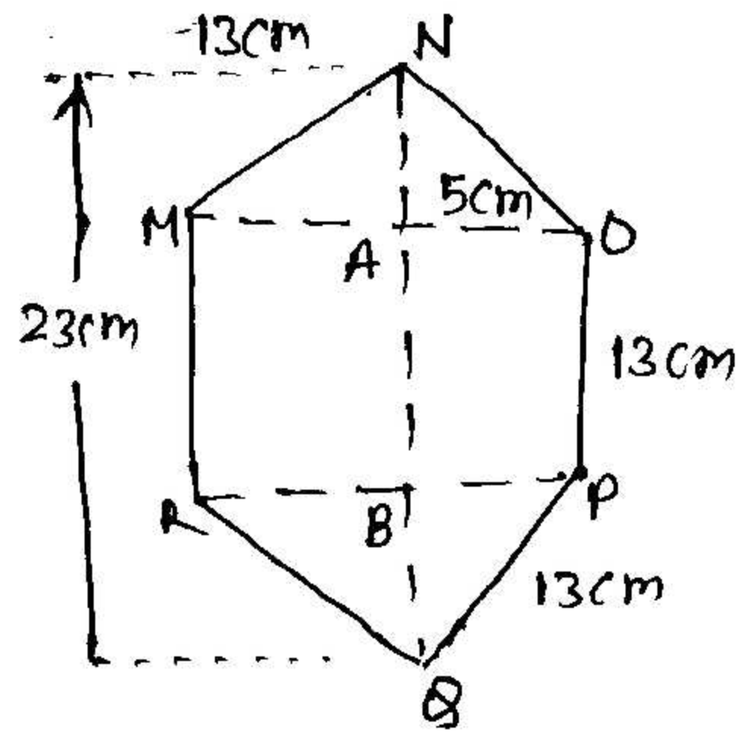

$NQ = 23\,cm$

$NA = BQ = \frac{10}{2} = 5\,cm$

$MR = OP = 13\,cm$

In $\triangle BPQ$

$PQ^2 = BQ^2 + BP^2$

$\Rightarrow 13^2 = 5^2 + BP^2$

$\Rightarrow BP^2 = 169 - 25 = 144 \Rightarrow BP = 12\,cm$

Here $PR = MO = 2 \times 12 = 24\,cm$

Area of rectangle $RPOM = RP \times PO = 24 \times 13 = 312\,cm^2$

$Ar(\triangle) PRQ = \frac{1}{2} \times PR \times BQ$

$= \frac{1}{2} \times 24 \times 5 = 60\,cm^2$

Area of $\triangle MON = 60\,cm^2$

$\therefore$ Area of hexagon $= 312 + 60 + 60 = 432\,cm^2$

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