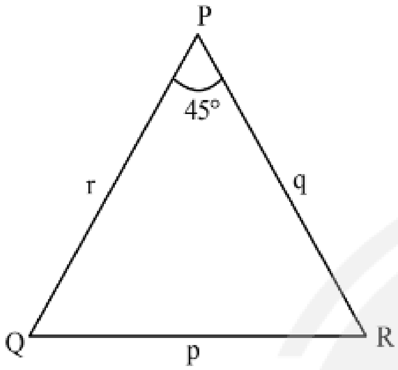
MBA PRO 2024

QUANTITATIVE APTITUDE

DPP -02

Triangles 2

Q1 In $\triangle PQR, p+q=\sqrt{2}+\sqrt{3}$ and $q-p=\sqrt{3}-\sqrt{2}$.
If $\angle P=45^{\circ}$ then find $\angle Q$.



(A) 30°
(B) 45°
(C) 60°
(D) 75°

Q2 In ΔMNO, two sides of a triangle are 13m and 5m and its area is 30 m^2. Find the sum of length of the third side and the perimeter of the triangle
(A) 12 m
(B) 30 m
(C) 42 m
(D) 72 m

Q3 The side MN of a triangle in $40cm$ long. If the perimeter of triangle MNO is $100cm$ then what should be the smallest side of the triangle if $\angle N=60^{\circ}$.
(A) $25cm$
(B) $35cm$
(C) $40cm$
(D) $20cm$

Q4 The side MN of a triangle is $40cm$ long. If the perimeter of the triangle MNO is $100cm$ then what is the area of $\triangle MNO$ if $\angle N=60^{\circ}$
(A) $250\sqrt{3}cm^2$
(B) $125\sqrt{3}cm^2$
(C) $200\sqrt{3}cm^2$
(D) $160\sqrt{3}cm^2$

Q5 In $\triangle MNO, \angle M=\left(\frac{\pi}{3}\right), m=4$ and $o=5$ then which equation satisfies. 'm' represents the side opposite angle M, 'n' represents the side opposite angle N and 'o' represents the side opposite angle O
(A) $n^2-5n+9=0$
(B) $n^2-4n+9=0$
(C) $n^2-3n+9=0$
(D) $n^2-6n+9=0$

Q6 If $k=19, l=13$ and $m=15$ then find the value of $\operatorname{Cos} K$ in $\triangle KLM$ given k, l and m represent the sides opposite the angles K, L and M respectively
(A) $\left(\frac{11}{130}\right)$
(B) $\left(\frac{33}{130}\right)$
(C) $\left(\frac{11}{33}\right)$
(D) $\left(\frac{33}{11}\right)$

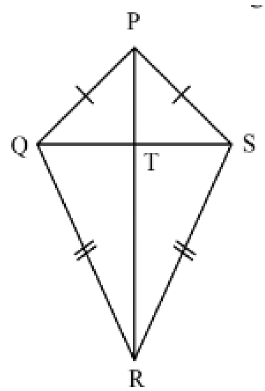
Q7 If $\triangle ABC$ and $\triangle PQR$ are similar by AA criteria $(\angle A=\angle P)$ and $(\angle B=\angle Q)$. if $AB=10cm, PQ=\ 4cm$ and $BC=9cm$ then find QR.
(A) $3cm$
(B) $3.3cm$
(C) $3.6cm$
(D) $4cm$

Q8 If $\triangle ABC$ and $\triangle PQR$ are similar by SAS criteria where $\angle B=\angle Q$. $\frac{AB}{PQ}=\frac{BC}{QR}$ if $AB=10cm, PQ=\ 4cm, AC=12cm$ then find PR.

(A) $4.8cm$ (B) $48cm$
(C) $10cm$ (D) $26cm$

Q9 If $\triangle ABC$ and $\triangle PQR$ are congruent by SSS where $AB = 5cm, PQ = 5cm, BC = QR = 6cm$ and $AC = 10$ then find PR (in cm)
(A) 5 (B) 6
(C) 10 (D) 11

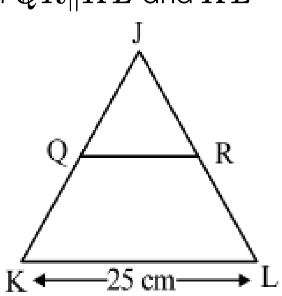
Q10 In the following figure, PQ = PS, QR = SR then which of the following can be true?



(A) $\angle QPT = \angle SPT$
(B) $\angle QRT = \angle SRT$
(C) PR bisect QS
(D) All of the above

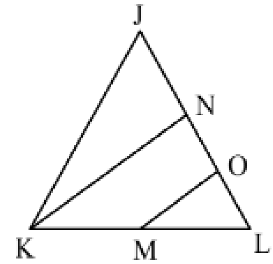
Q11 In $\triangle MNO, MN = MO$ and MP bisects NO then $\triangle MNP \cong \triangle MOP$ by which criteria.
(A) (AAS) (B) (AAA)
(C) (RHS) (D) (SSS)

Q12 In $\triangle JKL, Q$ and R are the midpoint of JK and JL respectively. What is the length of QR if $QR \| KL$ and $KL = 25cm$



(A) $13.5cm$ (B) $17.5cm$
(C) $12.5cm$ (D) $25.5cm$

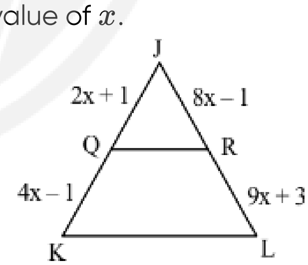
Q13 In $triangle JKL, M$ is the midpoint of KL and N is the midpoint of JL. Find the Relation between OL and JL if it in given that $OM \| KN$



(A) $OL = \frac{1}{2} \times JL$
(B) $OL = \frac{1}{3} \times JL$
(C) $OL = \frac{1}{4} \times JL$
(D) $OL = \frac{1}{6} \times JL$

Q14 In $\triangle JKL, Q$ and R are the points on side JK and JL respectively. If $\frac{JQ}{QK} = \frac{7}{9}$ and $JL = 32cm$ find JR if QR|| KL.
(A) $13cm$ (B) $14cm$
(C) $15cm$ (D) $16cm$

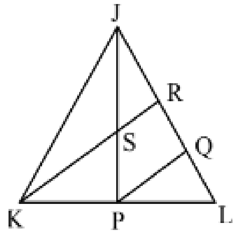
Q15 In $\triangle JKL, Q$ and R are the points on side JK and JL respectively. if $QR \| KL$ then find the value of x.



(A) 1 (B) 2
(C) 3 (D) 4

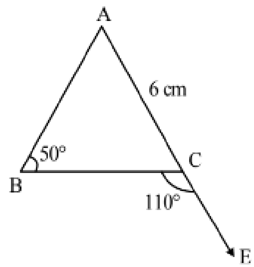
Q16 In the given $\triangle JKL, JS : SP = 3 : 2$ and $KP : PL = 4 : 7$. if $JL = 8.5cm$ Then find the ratio of the length of JQ:RL if it in given that

$KR||PQ$



(A) 1 : 2
(B) 7 : 4
(C) 2 : 3
(D) 10 : 11

Q17



In the above figure, $AB = 7cm, AC = 6cm$, and $\angle B = 50^\circ$ Also side AC is extended upto E. Find the area of $\triangle ABC$.

(A) $21\sqrt{3}cm^2$
(B) $\frac{63}{2\sqrt{3}}cm^2$
(C) $\frac{11\sqrt{3}}{2}cm^2$
(D) None of these

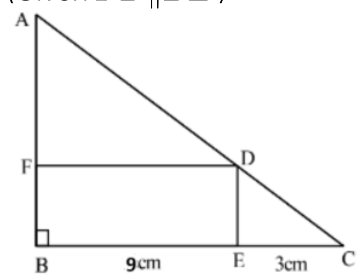
Q18 ABC is a triangular field having area $65536cm^2$. Harsh draws a median to BC, naming it AD. He again draws a median AE to BD, and keeps doing the same until he draws a total of 8 medians. Find the area of smallest triangle formed using this median.

(A) 2^8cm^2
(B) $1024cm^2$
(C) $2^{12}cm^2$
(D) Can't be determined

Q19 Hypotenuse DF of a right angled $\triangle DEF$ is $65cm$ and area is $504cm^2$. EG is drawn on DF such that $EG \perp DF$ and GH is drawn on EF such that $GH \perp EF$. Find the approximate length of EF if $EF > DE$.

(A) $32cm$
(B) $54cm$
(C) $45cm$
(D) $63cm$

Q20 Area of triangle as shown is $30cm^2$. $DE||AB$ is drawn such that EC is $1/4^{\text{th}}$ of BC. If $BC = 12cm$, then find the area of $\triangle AFD$ (Given $FD||BE$)



(A) $17.750cm^2$
(B) $16.875cm^2$
(C) $17.225cm^2$
(D) None of these

Q21 Two sides of a triangle are $8cm$ and $11cm$. Third side is the maximum possible integer. A perpendicular is drawn on the smallest side from, the vertex opposite to it. Find the approximate length of the perpendicular.

(A) $\frac{27}{4}cm$
(B) $\frac{23}{4}cm$
(C) $\frac{21}{4}cm$
(D) $\frac{19}{4}cm$

Q22 The semi-perimeter of a scalene triangle is 15 cm. Which of the following cannot be the longest side of the triangle (in cm)?

(A) 12
(B) 13
(C) 14
(D) 16

Q23 $\Delta DEF \sim \Delta STU$, if $DE = 4cm, DF = 8cm$ and $SU = 12cm$, then find ST.

(A) $5cm$
(B) $6cm$
(C) $7cm$
(D) $10cm$

Q24

$\triangle ABC$ and $\triangle DEF$ are equilateral triangles and Area of triangle ABC = $\frac{9}{4}$ Area of triangle DEF . DE is $\frac{K}{3}$ of AB. What is the value of K ?

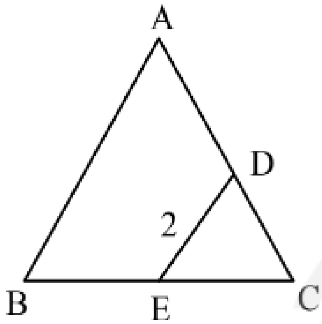
(A) 1

(B) 2

(C) 4

(D) Can't be determined

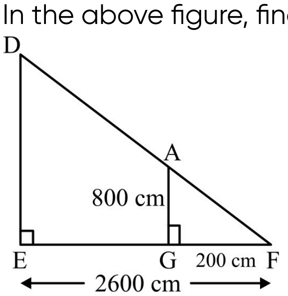
Q25 In the figure given, $\triangle ABC \sim \triangle DEC$ and Ar $\triangle DEC = 36$. If $AB = 6cm$ and $DE = 2cm$ then find the area of the quadrilateral ADEB



(A) $288cm^2$ (B) $312cm^2$

(C) $324cm^2$ (D) $346cm^2$

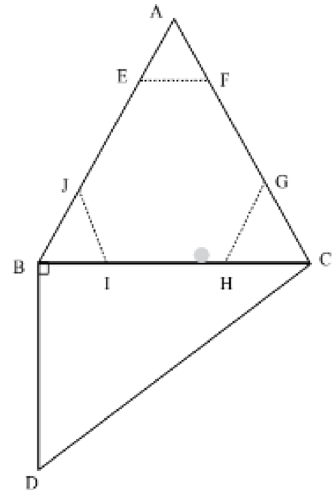
Q26 In the above figure, find DE given that DE || AG



(A) $104cm$ (B) $1040cm$

(C) $104m$ (D) $1040m$

Q27 In the figure given, $\angle ABC = \angle ACB = 60^\circ, CD = 29cm, EF \mid BC, JI \| AC$ and $GH \| AB$. Also, BD = 20 cm, IH = $\frac{1}{3}$ BC and each side of the figure $EFGHIJ$ is equal, Find the area of the shape named EFGHIJ.



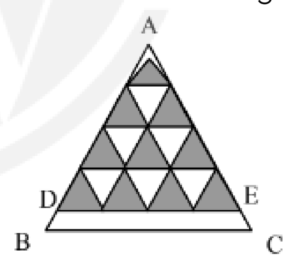
(A) $127.3cm^2$

(B) $129.5cm^2$

(C) $73\sqrt{3}cm^2$

(D) $132.3cm^2$

Q28 The diagram shows 10 equilateral triangles (shaded) inside an equilateral triangle ABC. Smaller triangles are placed such that they touch among themselves externally. Height of the $\triangle ADE$ is $6\sqrt{3}cm, EC = 2cm$ and $DE \| BC$. Find the area of $\triangle ABC$ excluding the 10 smaller triangle.



(A) $24.5cm^2$

(B) $26cm^2$

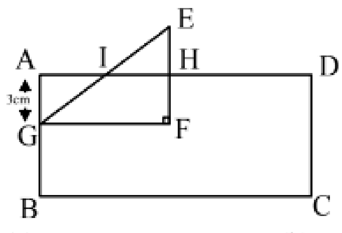
(C) $26.5\sqrt{3}cm^2$

(D) $27cm^2$

Q29 A wire of length $60m$ is cut into two parts such both are used to form equilateral triangles. The area of larger triangle is $\frac{9}{4}$ of smaller triangle's area. Find the side of larger triangle

(A) $14m$
(B) $13m$
(C) $12m$
(D) Can't be determined

Q30 $ABCD$ is a rectangle and $\triangle EFG$ is drawn such that $GF \| AH$. $AG = 3cm, \angle IGF = 60^\circ$ and $GF = 5cm$. Find the approx. length of EI.



(A) $6.5cm$
(B) $7cm$
(C) $7.2cm$
(D) $7.5cm$

Answer Key

Q1	(C)
Q2	(C)
Q3	(A)
Q4	(A)
Q5	(A)
Q6	(A)
Q7	(C)
Q8	(A)
Q9	(C)
Q10	(D)
Q11	(D)
Q12	(C)
Q13	(C)
Q14	(B)
Q15	(B)
Q16	(D)
Q17	(B)
Q18	(A)
Q19	(D)
Q20	(B)
Q21	(A)
Q22	(D)
Q23	(B)
Q24	(B)
Q25	(A)
Q26	(C)
Q27	(A)
Q28	(C)
Q29	(C)
Q30	(A)

Hints & Solutions

Q1 Text Solution:

Topic - Triangles

$$p + q = \sqrt{2} + \sqrt{3}$$
$$q - p = \sqrt{3} - \sqrt{2}$$

On solving both equations we get, $q = \sqrt{3}$ and $p = \sqrt{2}$

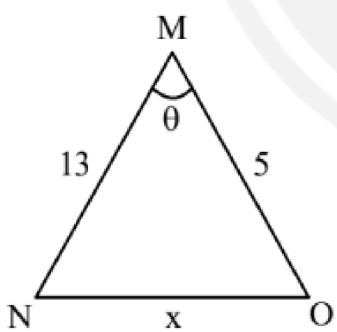
By using Sine rule

$$\Rightarrow \frac{p}{\sin P} = \frac{q}{\sin Q}$$
$$\Rightarrow \frac{\sqrt{2}}{\sin 45^\circ} = \frac{\sqrt{3}}{\sin Q}$$
$$\operatorname{Sin} Q = \frac{\sqrt{3}}{2} = \operatorname{Sin} 60^\circ$$
$$Q = 60^\circ$$

Hence option (c)

Q2 Text Solution:

Topic - Triangles



As we know,

Area of a triangle = $\frac{1}{2}\, ab \times \sin\,\theta$

$$\frac{1}{2} \times 13 \times 5 \times \sin\,\theta = 30$$
$$Sin\ \theta = \frac{12}{13} = \frac{P}{H}$$
$$Cos\ \theta = \sqrt{1 - Sin^2\,\theta} = \frac{5}{13} = \frac{B}{H}$$
$$Cos\ \theta = \frac{13^2 + 5^2 - x^2}{2 \times 13 \times 5}$$
$$\frac{5}{13} = \frac{194 - x^2}{130}$$
$$x^2 = 144$$
$$x = 12$$

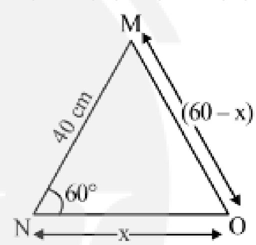
Required Sum = 5 + 13 + 12 + 12 = 42 m

Q3 Text Solution:

Topic - Triangles

One side = 40cm

Let the other two sides are x and (60 – x)

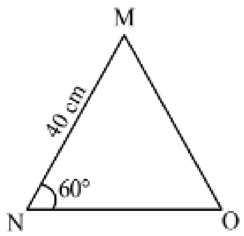


By using Cosine rues

$$\text{Cos } 60 = \frac{40^2 + x^2 - (60 - x)^2}{2 \times 40 \times x}$$
$$\Rightarrow \frac{1}{2} = \frac{1600 + x^2 - 3600 - x^2 + 120x}{2 \times 40x}$$
$$\Rightarrow 40x = -2000 + 120x$$
$$\Rightarrow 80x = 2000$$
$$x = 25cm$$
$$\text{Other side } = 60 - 25 = 35cm$$
$$\text{Smallest side } = 25cm$$

Q4 Text Solution:

Topic - Triangles



Let the other two sides are x and $(60-x)$

By using cosine rule we get,

$\operatorname{Cos} 60=\frac{40^2+x^2-(60-x)^2}{2 \times 40 \times x}$

On solving further we get, $x=25$

Other side $=60-25=35$

$s=\frac{a+b+c}{2} \Rightarrow \frac{40+25+35}{2} \Rightarrow \frac{100}{2}=(50)$

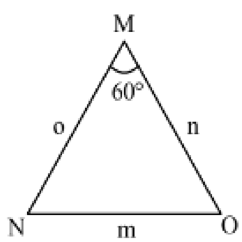
area of $\triangle MNO=\sqrt{50 \times 10 \times 25 \times 15}$

$\Rightarrow \sqrt{25 \times 2 \times 5 \times 2 \times 25 \times 5 \times 3}$

$\Rightarrow 5 \times 2 \times 5 \times 5 \times \sqrt{3}$

$\Rightarrow 250 \sqrt{3}$

Q5 Text Solution:



$$\operatorname{Cos} 60^{\circ}=\frac{o^2+n^2-m^2}{2 \times 0 \times n}$$

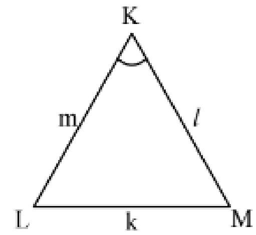
$$\frac{1}{2}=\frac{25+n^2-16}{2 \times 5 \times n}$$

$$\Rightarrow 5 n=9+n^2$$

$$\Rightarrow n^2-5 n+9=0$$

Q6 Text Solution:

Topic - Triangles



$$\operatorname{Cos} K=\frac{m^2+l^2-k^2}{2 \times m \times l}$$

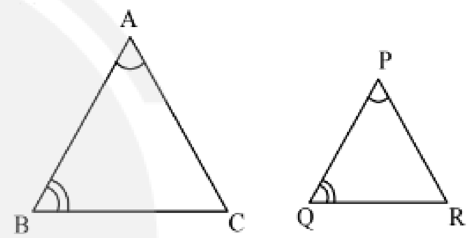
$$=\frac{15^2+13^2-19^2}{2 \times 15 \times 13}=\frac{225+169-361}{390}$$

$$=\frac{33}{390}$$

$$=\frac{11}{130}$$

Q7 Text Solution:

Topic - Triangles



$\triangle ABC \sim \triangle PQR$ then

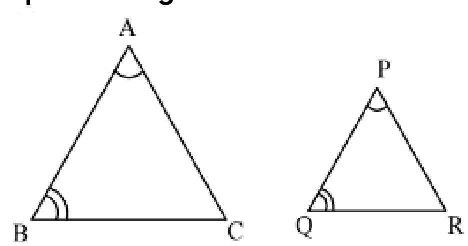
$$\frac{AB}{PQ}=\frac{BC}{QR}$$

$$\Rightarrow \frac{10}{4}=\frac{9}{QR}$$

$$\Rightarrow QR=\frac{9 \times 4}{10}=3.6 cm$$

Q8 Text Solution:

Topic - Triangles

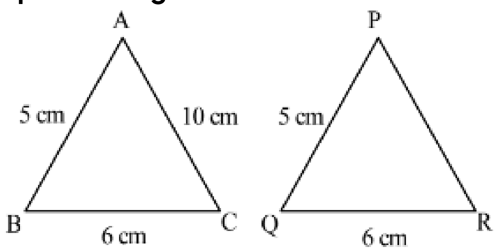


$\triangle ABC \sim \triangle PQR($ by SAS)

$$\frac{AB}{PQ} = \frac{AC}{PR}$$
$$\Rightarrow \frac{10}{4} = \frac{12}{PR}$$
$$\Rightarrow PR = \frac{48}{10} = 4.8cm$$

Q9 Text Solution:

Topic - Triangles



$$\triangle ABC \cong \triangle PQR \text{ (by SSS)}$$

Then

$$AB = PQ$$
$$BC = QR$$
$$AC = PR = 10cm$$

Q10 Text Solution:

Topic - Triangles

In $\triangle PQR$ and $\triangle PSR$

$PQ = PS$ (Given)

$QR = RS$ (Given)

$PR = PR($ Common)

$\triangle PQR \cong \triangle PSR$ (by SSS criteria)

(1) $\angle QPT = \angle SPT$ (by $CPCT$)

(2) $\angle QRT = \angle SRT($ by $CPCT$)

In $\triangle PQT$ and $\triangle PST$

$PQ = PS$ (Given)

$PT = PT$ (Common)

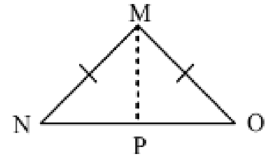
$\angle QPT = \angle SPT$ (Proved above)

$\triangle PQT \cong \triangle PST$

(3) $QT = TS(CPCT)$

Q11 Text Solution:

Topic - Triangles



$$MN = MO(\text{ Given })$$
$$MP = MP(\text{ Common })$$
$$NP = PO(MP \text{ Bisect NO})$$
$$\triangle MNP \cong \triangle MOP \text{ (BY SSS Criteria)}$$

Q12 Text Solution:

Topic - Triangles

In $\triangle JKL, Q$ and R are two midpoint and $QR \| KL$. By using midpoint theorem, we can say that,

$$QR = \frac{1}{2} \times KL$$
$$QR = \frac{1}{2} \times 25$$
$$= 12.5cm$$

Q13 Text Solution:

Topic - Triangles

In $\triangle KLN, M$ is the midpoint of KL and $OM \| KN$.

$\triangle MOL \sim \triangle KNL$.

By midpoint theorem, we can say that

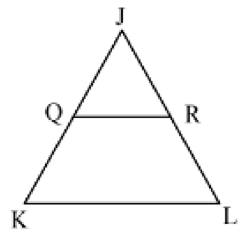
$$\left(OM = \frac{1}{2} \times KN\right) \text{ and } \left(OL = \frac{1}{2} \times NL\right)$$

Here N is the midpoint of JL

$$NL = JN = \frac{1}{2} \times JL$$
$$OL = \frac{1}{2} \times NL$$
$$\Rightarrow OL = \frac{1}{2} \times \left(\frac{1}{2} \times JL\right)$$
$$\Rightarrow OL = \frac{1}{4} \times JL$$

Q14 Text Solution:

Topic - Triangles



Here, QR || KL

$$\Delta JQR \sim \Delta JKL, \frac{JQ}{JK} = \frac{JR}{JL} = \frac{QR}{KL}$$

$$\frac{JQ}{QK} = \frac{7}{9}$$

This can be written as

$$\frac{JQ}{JK} = \frac{7}{16}$$
$$\frac{JQ}{JK} = \frac{JR}{JL}$$
$$\Rightarrow \frac{7}{16} = \frac{JR}{32} \Rightarrow JR = 14cm.$$

Q15 Text Solution:

Topic - Triangles

QR || KL (Given)

By using thales (BPT) Theorem we get,

$$\frac{JQ}{JK} = \frac{JR}{JL} = \frac{QR}{KL}$$

Similarly,

$$\frac{JQ}{QK} = \frac{JR}{RL}$$
$$\frac{2x+1}{4x-1} = \frac{8x-1}{9x+3}$$
$$\Rightarrow (2x+1)(9x+3) = (8x-1)(4x-1)$$
$$\Rightarrow 18x^2 + 6x + 9x + 3 = 32x^2 - 8x - 4x + 1$$
$$\Rightarrow 14x^2 - 27x - 2 = 0$$
$$\Rightarrow 14x^2 - 28x + x - 2 = 0$$
$$\Rightarrow 14(x-2) + 1(x-2) = 0$$
$$\Rightarrow (x-2)(14x+1) = 0$$
$$x = 2 \text{ or } x = \frac{-1}{14}$$

$x = 2$ will be the correct choice.

Q16 Text Solution:

Topic - Triangles

Here, $KR \| PQ$ is given so

In $\triangle KRL, \triangle KRL \sim \triangle PQL$ by Thales theorem.

$$\frac{KP}{PL} = \frac{RQ}{QL} = \frac{4}{7}$$

In $\triangle JPQ, \Delta JSR \sim \triangle JPQ$ by Thales theorem.

$$\frac{JS}{SP} = \frac{JR}{RQ} = \frac{3}{2}$$

By using equation (1) and (2) we can say that,

$JR : RQ : QL = 6 : 4 : 7$

$JR + RQ + QL = 17$ units

17 units $= 8.5cm$

1 unit $= \frac{8.5}{17} = 0.5$

$$JQ = JR + RQ = 10 \text{ units } = 10 \times 0.5$$

$$\begin{aligned} &JQ = 5cm \\ &RL = RQ + QL = 11 \text{ units} \\ &11 \text{ units } = 11 \times 0.5 = 5.5cm \\ &\text{Required ration } = JQ : RL \\ &\Rightarrow 5 : 5.5 \\ &= 10 : 11 \end{aligned}$$

Q17 Text Solution:

Topic - Triangles

Using linear pair,

$$\begin{aligned} &\angle ACB = (180^\circ - 110^\circ) = 70^\circ \\ &\text{And } \angle A = [180^\circ - (50^\circ + 70^\circ)] \\ &= 60^\circ \end{aligned}$$

Therefore, Area of $\triangle ABC$

$$= \frac{1}{2} \times AB \times AC \times \text{Sin}$$

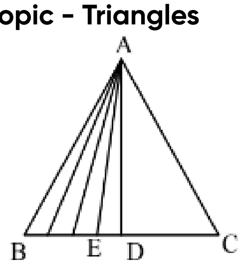
$$A(\text{ Using the sine rule})$$

$$= \left(\frac{1}{2} \times 7 \times 6 \times \sin 60^\circ\right) cm^2$$

$$= \frac{42}{2} \times \frac{\sqrt{3}}{2} cm^2 = \frac{21\sqrt{3}}{2} cm^2 = \frac{63}{2\sqrt{3}} cm^2$$

Q18 Text Solution:

Topic - Triangles



We know that, median divides the triangle into two equal parts.

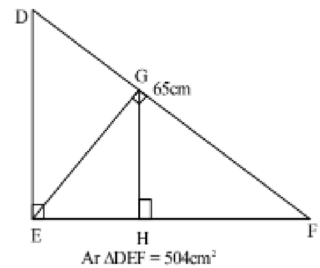
So, AD divides $\triangle ABC$ into two triangle having equal area.

and AE divides $\triangle ABD$ into two triangle having equal area and so on.

Therefore, for triangle formed using 8^{th} median drawn, it's area $= \left(\frac{1}{2^8} \times Ar.\Delta ABC\right) cm^2 = 256cm^2$

Q19 Text Solution:

Topic - Triangles



Given $DF = 65cm$ and $Ar\triangle DEF = 504cm^2$

Also, $EF > DE$

Now,

$$\frac{1}{2} \times DE \times EF = 504cm^2$$
$$\Rightarrow DE \times EF = 1008cm^2$$

And $DE^2 + EF^2 = (65)^2$ (Using Pythagoras theorem)

$$\Rightarrow (DE + EF)^2 - (2DE \times EF) = 4225$$

$$\Rightarrow DE + EF = \sqrt{6241} = 79cm \ldots\ldots\ldots\ldots 1$$

And $EF - DE = \sqrt{2209} = 47cm \ldots\ldots\ldots 2$

Adding eq. (1) and (2), we get

$$EF = 63cm$$

Q20 Text Solution:

Topic - Triangles

Given, $\mathrm{Ar} \triangle ABC = 30cm^2$

$$\Rightarrow \frac{1}{2} \times AB \times BC = 30cm^2$$
$$\Rightarrow AB \times 12cm = 60cm^2$$
$$\text{or } AB = 5cm,$$

Also, $AB \| DE$ and $EC = \frac{1}{4} \times BC = 3cm$

Then, $\frac{DE}{EC} = \frac{AB}{BC}$

or $DE = \frac{5}{12} \times 3 = \frac{15}{12} = \frac{5}{4}cm = FB$

Now, $AF = AB - FB$

$= \left(5 - \frac{5}{4}\right) cm = \frac{15}{4}cm$

And $FD = BE = (12 - 3)cm = 9cm$

Therefore, $Ar\triangle AFD = \left(\frac{1}{2} \times \frac{15}{4} \times 9\right) cm$

$= \frac{135}{8}cm^2 \approx 16.875cm$

Q21 Text Solution:

Topic - Triangles

Given, two sides 8 and $11cm$.

Let $a = 8cm, b = 11cm$ and c be the third side.

We know that;

$$a + b > c$$
$$\text{or } 8 + 11 > c$$
$$\text{or } 19 > c$$

So, c can be maximum $18cm$

Now area of triangle using Heron's formula

$$= \sqrt{\frac{37}{2} \times \left(\frac{37}{2} - 8\right) \times \left(\frac{37}{2} - 11\right) \times \left(\frac{37}{2} - 18\right)}$$
$$= \sqrt{18.5 \times 10.5 \times 7.5 \times .5}cm^2$$
$$\approx 26.98cm^2$$
$$\approx 27cm^2$$

Also, Area $\Delta = \frac{1}{2} \times$ smallest side $\times$ perpendicular drawn (say K) $= 27cm^2$

Or $\frac{1}{2} \times 8 \times K = 27cm^2$

$$\text{Or } K = \frac{27}{4}cm$$

Q22 Text Solution:

Topic - Triangles

Let a, b and c be the three sides of triangle in ascending order.

So, semi-perimeter=$S = \frac{a+b+c}{2}$

For existence of triangle, sum of two side>3rd side

$a + b > c$

$\Rightarrow a + b + c > 2c$

$\Rightarrow \frac{a+b+c}{2} > c$

So, deducing from here, larger side should be smaller than semi-perimeter.

Therefore, c < 15.

Thus, 16 is the only option which is not possible.

Q23 Text Solution:

Topic - Triangles

Because $\triangle DEF \sim \wedge STU$

So, $\frac{DE}{ST} = \frac{DF}{SU}$ (Corresponding sides are proportional)

$$\Rightarrow \frac{4}{ST} = \frac{8}{12} \Rightarrow ST = 6cm$$

Q24 Text Solution:

Topic - Triangles

Given, $\mathrm{Ar} \triangle ABC = \frac{9}{4} Ar\triangle DEF$

or $\frac{\mathrm{Ar} \triangle ABC}{\mathrm{Ar} \triangle DEF} = \frac{9}{4}$

Also, $\triangle ABC \sim \triangle DEF$ (Equilateral triangle)

So, $\frac{9}{4} = \frac{(AB)^2}{(DE)^2}$

or, $\frac{AB}{DE} = \frac{3}{2}$

or, $DE = \frac{2}{3}AB$

So, $K = 2$

Q25 Text Solution:

Topic - Triangles

Because $\triangle ABC \sim \triangle DEC$

$$\text{So, } \frac{\text{Ar } \triangle ABC}{\text{Ar } \triangle DEC} = \frac{(AB)^2}{(DE)^2}$$
$$\text{or } \frac{\text{Ar } \triangle ABC}{36} = \frac{(6)^2}{(2)^2}$$
$$\text{or } Ar\triangle ABC = (9 \times 36)cm^2$$
$$= 324cm^2$$

Therefore, Ar ☐ ADEB

$$= (324 - 36)cm^2$$

$= 288cm^2$

Q26 Text Solution:

Topic - Triangles

Because DE || AG

$$\text{So, } \frac{DE}{AG} = \frac{EF}{GF}$$
$$\Rightarrow \frac{DE}{800cm} = \frac{2600cm}{200cm}$$
$$\Rightarrow DE = 10400cm$$
$$= 104m$$

Therefore, $DE = 104m$

Q27 Text Solution:

Topic - Triangles

Given, in $\triangle CBD, CD = 29cm$ and $BC > BD$.

Also, $\triangle CBD$ is a right angled triangle.

If we recall, $(20, 21, 29)$ is a Pythagorean triplet and here hypotenuse $= 29$.

so, $BC = 21cm$ and $BD = 20cm$,

or $IH = \frac{1}{3}BC = \left(\frac{1}{3} \times 21\right) cm = 7cm$.

Also, two angles of $\triangle ABC$ are equal to 60° each. So, it is an equilateral triangle.

And it's area $= \frac{\sqrt{3}}{4} \times (21)^2 = \frac{441\sqrt{3}}{4}cm^2$

Area of $\triangle JBI$

$= \frac{\sqrt{3}}{4} \times (7)^2$ (As $JI \| AC$ and $JI = IH$ so, it is also

an equilateral triangle of side $7cm$)

$$= \frac{49\sqrt{3}}{4}cm^2$$

Therefore, required area of shape

$$= \left[\frac{441\sqrt{3}}{4} - \left(3 \times \frac{49\sqrt{3}}{4}\right)\right] cm^2$$

$$= \frac{(441 - 147)\sqrt{3}}{4}cm^2$$
$$= \frac{294\sqrt{3}}{4}cm^2$$
$$= 73.5\sqrt{3}cm^2$$
$$\approx 127.3cm^2$$

Q28 Text Solution:

Topic - Triangles

Given, height of $\triangle ADE = 6\sqrt{3}cm$ and $DE \| BC$.

So, $\angle ADE = \angle ABC = 60^\circ$

or $\triangle ADE$ is an equilateral triangle

That means,

$$\frac{\sqrt{3}}{2} \times \text{ side } = \text{ height}$$
$$\Rightarrow \frac{\sqrt{3}}{2} \times \text{ side } = 6\sqrt{3}$$

or side $= 12cm$

or $AE = DE = 12cm$

Also, $EC = 2cm$

So, $AE + EC = (12 + 2)cm = 14cm$

Now, Area of equilateral triangle

$$= \left[\frac{\sqrt{3}}{4} \times (14)^2\right] cm^2 = 49\sqrt{3}cm^2$$

Each side of smaller triangle $= \frac{12}{4} = 3cm$

So, area of 10 equilateral triangle

$$= \left(10 \times \frac{\sqrt{3}}{4} \times (3)^2\right) cm^2 = \frac{45\sqrt{3}}{2}cm^2$$

Therefore, area of required portion of $\triangle ABC$

$= \left(49\sqrt{3} - \frac{45\sqrt{3}}{2}\right) cm^2 = \frac{53\sqrt{3}}{2}cm^2$

Q29 Text Solution:

Topic - Triangles

Let the side of smaller triangle be xm Also, they are similar to each other.

So larger side of triangle $= \left(\frac{3}{2} \times x\right) m = \frac{3x}{2}m$

$$\begin{aligned}
&\text{So, } \left(\frac{3x}{2} \times 3\right) + 3x = 60 \\
&\Rightarrow \frac{9x}{2} + 3x = 60 \\
&\Rightarrow \frac{15x}{2} = 60 \\
&\Rightarrow x = 8m
\end{aligned}$$

Therefore, side of larger one

$= \left(\frac{3}{2} \times 8\right) = 12m$

Q30 Text Solution:

Topic - Triangles

Given, $IH \| GF$

So, $\triangle EHI \sim \triangle EFG$

or $\frac{EH}{IH} = \frac{EF}{GF}$

Also, $EF = GF \tan 60^\circ$

$= (5 \times \sqrt{3})cm$

$= 5\sqrt{3}cm$

Then, $EH = (5\sqrt{3} - 3)cm$

Now

$$IH = \frac{(5\sqrt{3} - 3) \times 5}{5\sqrt{3}} = \left(5 - \frac{3}{\sqrt{3}}\right)$$

Applying Pythagoras theorem in $\triangle EIH$,

$$\begin{aligned}
IE &= \sqrt{(5\sqrt{3} - 3)^2 + \left(5 - \frac{3}{\sqrt{3}}\right)^2} cm \\
&\approx \sqrt{(5.66)^2 + 10.67cm} \\
&\approx \sqrt{42.70}cm = 6.5cm
\end{aligned}$$

approx.