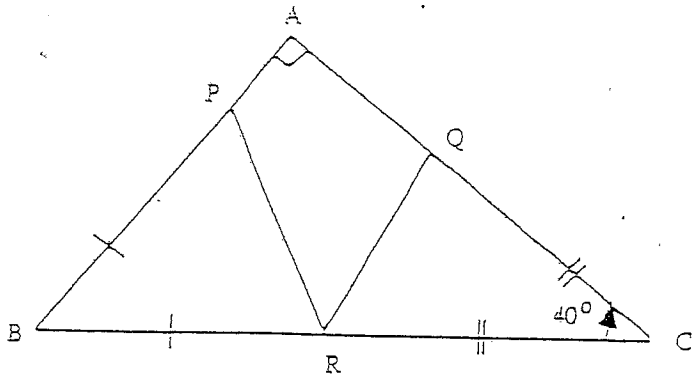
PLANE GEOMETRY TEST

Question 1:

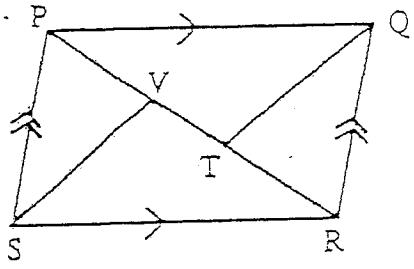
In the diagram below, ΔABC is a right triangle with $\angle BAC = 90^\circ$, CQ=CR, PB = RB and $\angle ACB = 40^\circ$.



(i) Copy this diagram onto your answer sheet.
(ii) Write down the size of $\angle PRQ$.

Question 2:

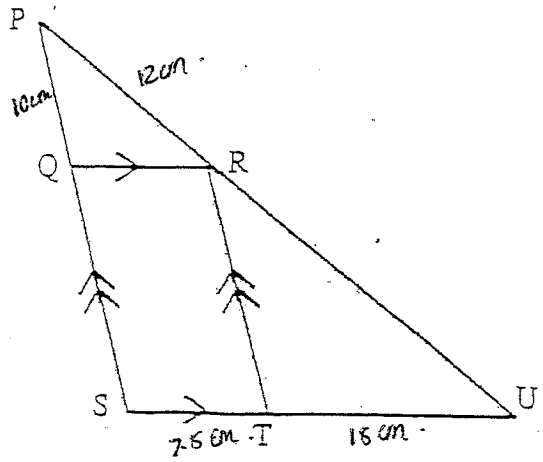
PQRS is a parallelogram. TQ biscts $\angle PQR$ and VS bisects $\angle PSR$.



(i) Copy this diagram onto your answer sheet.
(ii) State why $\angle PQR = \angle PSR$.
(iii) Prove that ΔPVS and ΔRTQ are congruent.
(iv) Hence find the length of TV if PR = 20 cm and TR = 8 cm.

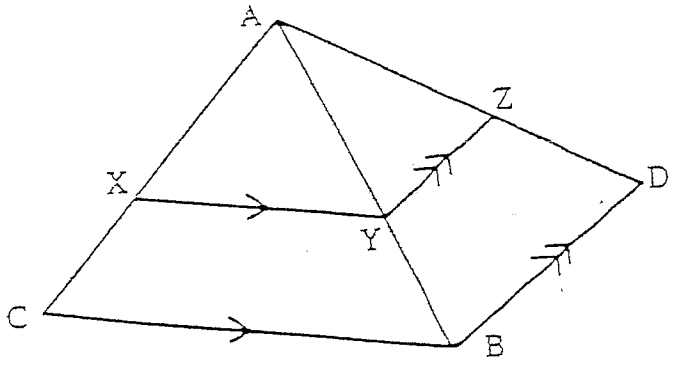
Question 3:

In the triangle PSU, QR//SU, SP//TR, ST = 7.5 cm, PQ = 10 cm, PR = 12 cm and UT = 15 cm. Find the length of RU giving reasons.



Question 4:

ABC and ABD are two triangles. X, Y and Z are points such that XY//CB and YZ??BD. Prove that XY:YZ = CB:BD.



Question 5:

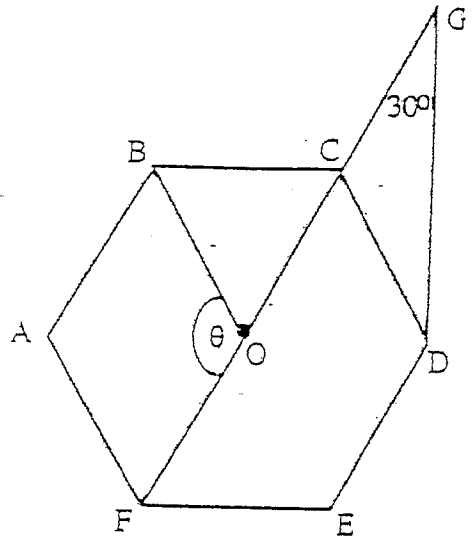
A decagon has 10 sides. Consider a regular decagon. Find

(a) the interior angle sum (b) The size of each interior angle

(c) The exterior angle sum (d) The size of each exterior angle

Question 6:

Below is a regular hexagon, ABCDEF with centre O. FOCG is a straight line and $\angle CGD = 30°$.

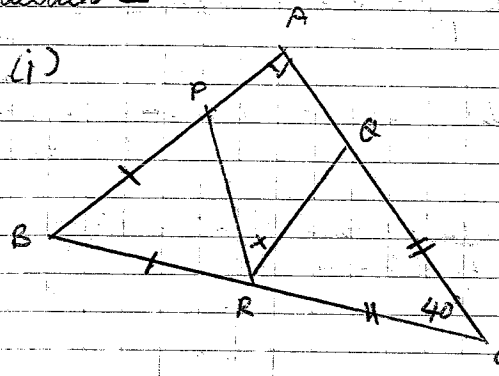


(i) Find $\angle FAB$
(ii) Find $\angle BOF$
(iii) Prove that ΔCDG is isosceles.

PLANE GEOMETRY

Question 1

i)



ii) $\angle ABC = 180^\circ$ (∠ sum of △) $- (90 + 40)$
$= 50^\circ$. ✓

△PBR is isosceles (2 equal sides PB = BR)
$\angle PRB = \angle BPR$ (base ∠s of isosceles △ equal).
~~$\angle PBR = 180$ (∠ sum of △) $- 50$~~
$2\angle PRB = 180$ (∠ sum of △) $- 60$.
$= 130$
$\angle PRB = \frac{130}{2}$
$= 65^\circ$. ✓

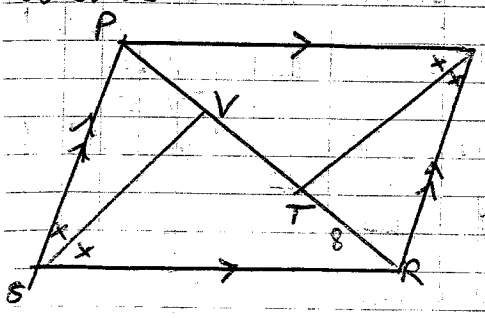
△CQR is isosceles (2 equal sides QC = RC).
$\angle RQC = \angle QRC$ (base ∠ of isosceles △ equal).

$2 \times \angle QRC = 180$ (∠ sum of △) $- 40$.
$= 140$.
$\angle QRC = 70^\circ$.

$\therefore \angle PRQ = 180^\circ$ (∠ along straight line) $- (70 + 65)$.
$= 45^\circ$. ✓

(4)

Question 2



ii) $\angle PQR = \angle PSR$ (opposite ∠s of a parallelogram are equal). ✓

iii) In △PVS, RTQ,

PS = QRC opposite sides of a parallelogram are equal). ✓

~~Since~~ Since $\angle PQR = \angle PSR$ (opposite ∠s of a parallelogram are equal). ✓
and QT, VS bisects ∠PQR, ∠PSR respectively. ✓
~~bisects the~~ $\angle RQT = \angle PSV$
(~~bisected~~ halves of equal opposite ∠s in a parallelogram).
$\angle SPV = \angle TRQ$ (alternate; PS // QR)
$\therefore$ △PVS ≡ △RTQ (AAS) ✓

~~iii)~~

iv) PV = TR (corresponding sides of congruent △s equal). ✓
~~PQ~~ $= 8$cm.
VT = ~~PQ~~ 20cm (PR) − 8 (PV) − 8 (TR)
= 4cm. ✓

Question 3 - (P.T.O.)

~~7.5 12 (equal ratio of sides intercepting parallel lines PS // TR.)~~
~~15 RU~~
~~7.5 RU = 180~~
~~7.5 7.5~~
~~∴ RU = 24 cm~~

7

Question 4 -

In △AXY, ACB,
∠A is common. ✓
$\angle AYX = \angle ABC$ (corresponding; XY // CB). ✓
$\angle AXY = \angle ACB$ (corresponding; XY // CB). ✓
$\therefore$ △AXY /// ~~△ACB~~ (equiangular). ✓

$\therefore \frac{XY}{BC} = \frac{AY}{AB}$ (corresponding sides of similar △s in equal ratio). ✓

In △AYZ and △ABD,
∠A is common.
$\angle AYZ = \angle ABD$ (corresponding; YZ // BD)
$\angle AZY = \angle ADB$ (" ").
$\therefore$ △AYZ /// △ABD (equiangular). ✓

$\therefore \frac{ZY}{BD} = \frac{AY}{AB}$ (corresponding sides of similar $\triangle$s in equal ratios)

$\therefore \frac{AY}{AB} = \frac{ZY}{BD} = \frac{XY}{CB}$

$\frac{ZY}{BD} = \frac{XY}{CB}$

$\therefore XY : YZ = CB : BD$

5

Questions -

a) $(10-2) \times 180$
$= 1440°$

b) $\frac{1440°}{10}$ ($\angle$ sum of interior $\angle$s / no. of sides)
$= 144°$

c) exterior $\angle$ sum $= 360°$ ($\angle$ sum of exterior $\angle$s of polygons)

d) $\frac{360°}{10}$ ($\angle$ sum of exterior $\angle$s of polygons / no. of sides)
$= 36°$

4

Question 6 -

i) $\angle FAB = \frac{(6-2) \times 180°}{6}$ ($\angle$ sum of interior / no. of sides)
$\angle FAB = 120°$

ii) $\angle BOE = \frac{360°}{6}$ (revolution / 1)
$= 60°$

$\angle BOF = 180° - 60°$ ($\angle$s along straight line)
$= 60°$
$= 120°$

iii) $\angle CDE = \frac{(6-2) \times 180}{6}$ ($\angle$ sum of interior / no. of sides)
$= 120°$

$\angle DEF = \angle CDE = 120°$ (equal angles within regular polygon)

FEDC is an isosceles trapezium (2 equal sides opp. CD = FE equal sides of regular polygon)

$\therefore \angle OFE = \angle OCD$ (base $\angle$s of isosceles trapezium)

$\therefore 2 \times \angle OCD = 360°$ ($\angle$ sum of quadrilateral) $- (2 \times 120°)$

$\frac{\angle OCD}{OCD} = \frac{120}{2}$

$\angle OCD = 60°$

5

$\angle CDA = 60°$ (exterior $\angle$ of $\triangle CDA$)
$- 30°$
$= 30°$

$\therefore \angle CDA = \angle CAD = 30°$

$\therefore \triangle CDA$ is isosceles (2 equal base $\angle$s)

Question 3- In △ PQR, PSU,

∠P is common.
∠PQR = ∠PUS (corresponding; QR // SU).
∠PRQ = ∠PSU (" ").
∴ △PQR // △PSU (equiangular)

QR = ST = 7·5 (opposite side of parallelogram equal)

∴ $\frac{7\cdot5}{7\cdot5+15}$ (QR / SU) = $\frac{12}{12+RU}$ (corresponding sides of similar △s in equal ratios).

$\frac{7\cdot5}{22\cdot5} = \frac{12}{12+RU}$.

$7\cdot5(12+RU) = 12 \times 22\cdot5$.

$12+RU = \frac{270}{7\cdot5}$.

$RU = 36 - 12$.

~~RU = 24 cm~~.

RU = 24cm.

7

OR.

$\frac{7\cdot5}{15} = \frac{12}{RU}$ (equal ratio of sides intercepting parallel lines PS // TR).

∴ $7\cdot5\,RU = 180$

RU = 24cm.

sides).