QUESTION 1 :- (10 marks)

Fill in the blank with an appropriate term from this list.

PERPENDICULAR, COLLINEAR, OBTUSE, CORRESPONDING, CO-INTERIOR, ALTERNATE, SUPPLEMENTARY, ADJACENT, CONCURRENT, BISECTOR, INTERSECTING, COMPLEMENTARY, PARALLEL, ISOSCELES, EQUILATERAL, ACUTE.

(a) An _____ angle lies between 90° and 180°.

(b) An _____ triangle has two equal sides.

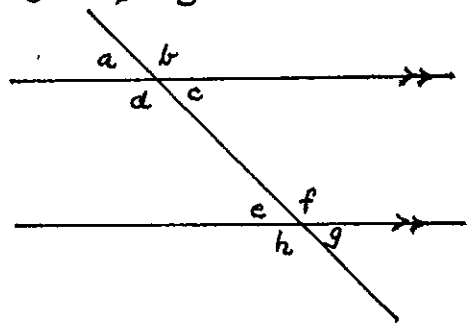
(c) Points that lie on the same straight line are called _____ points.

(d) _____ angles add up to 180°.

(e) Lines that pass through a common point are called _____ lines.

(f) Two lines which meet at right angles are said to be _____ to one another.

(g) A _____ of an angle divides the angle equally.



In the figure above,

(h) Angles a and e are called _____ angles.

(i) Angles c and f are called _____ angles.

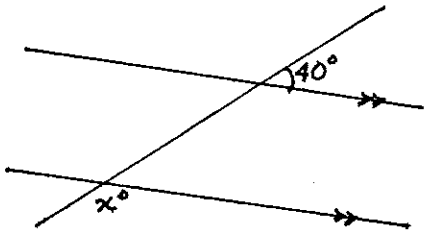
(j) Angles d and f are called _____ angles.

QUESTION 2 :- (10 marks)

(a) Find the sum of the interior angles of an Octagon.

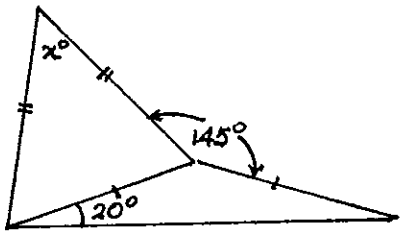
(b) If an interior angle of a regular polygon measures 144°, how many sides are there for the polygon?

(c)



Find the value of x (giving reasons)

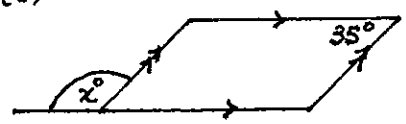
(d)



Find the value of x (without giving reasons)

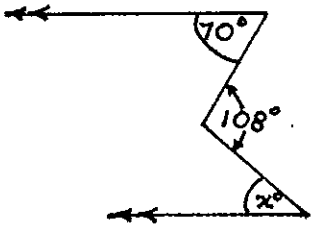
(2) (Cont'd)

(e)



Find x (giving reasons)

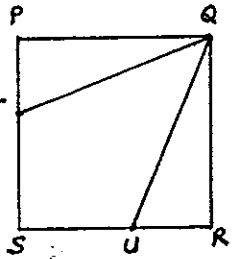
(f)



Find $x°$ (giving reasons)

QUESTION 3 :- (10 marks)

(a)

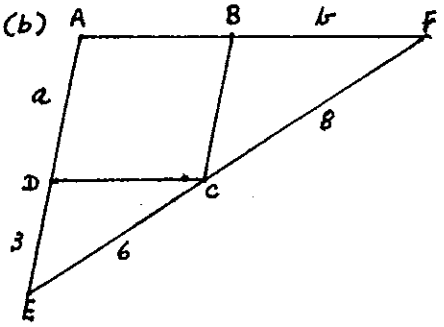


PQRS is a square.
If $P\hat{Q}T = R\hat{Q}U$,

(i) Prove that Δs PQT, RQU are congruent.

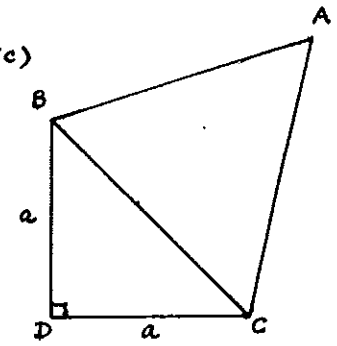
(3)(a)(ii) Prove that ST = SU

(b)



ABCD is a rhombus.
AD = a cm, DE = 3 cm,
CE = 6 cm, CF = 8 cm, BF = b cm.
Calculate the values of a and b.

(c)



Δ ABC is equilateral and has a perimeter of $30\sqrt{2}$ cm.
Find the value of a.
(Hint: Use Pythagoras Theorem)

QUESTION 4 : (6 marks)

(a) If $f(x) = \dfrac{x+1}{x-1}$

Find

(i) $f(0)$

(ii) $f(-1)$

(iii) $f(a+1)$

(b) Write down the natural domain of each of these functions

(i) $y = \dfrac{x^2}{2x+1}$

(ii) $y = 3\sqrt{5x-2}$

(iii) $y = \sqrt{3-x} + \sqrt{x-1}$

QUESTION 1 :- (10 marks)

Fill in the blank with an appropriate term from this list.

PERPENDICULAR, COLLINEAR, OBTUSE, CORRESPONDING, CO-INTERIOR, ALTERNATE, SUPPLEMENTARY, ADJACENT, CONCURRENT, BISECTOR, INTERSECTING, COMPLEMENTARY, PARALLEL, ISOSCELES, EQUILATERAL, ACUTE.

(a) An OBTUSE angle lies between 90° and 180°.

(b) An ISOSCELES triangle has two equal sides.

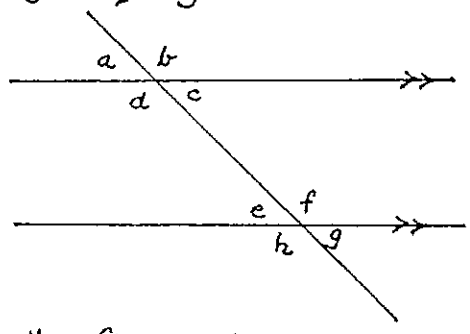
(c) Points that lie on the same straight line are called COLLINEAR points.

(d) SUPPLEMENTARY angles add up to 180°.

(e) Lines that pass through a common point are called CONCURRENT lines.

(f) Two lines which meet at right angles are said to be PERPENDICULAR to one another.

(g) A BISECTOR of an angle divides the angle equally.



In the figure above,

(h) Angles a and e are called CORRESPONDING angles.

(i) Angles c and f are called CO-INTERIOR angles.

(j) Angles d and f are called ALTERNATE angles.

QUESTION 2 :- (10 marks)

(a) Find the sum of the interior angles of an Octagon.

Sum = $(2n-4)\times 90°$

= $(2\times 8-4)\times 90°$

= $1080°$

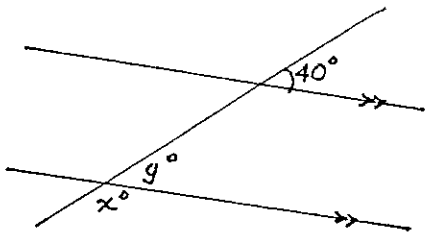
(b) If an interior angle of a regular polygon measures 144°, how many sides are there for the polygon?

Sum of the exterior angles of an n-sided polygon = 360°

$\therefore 36\times n = 360$

$\therefore n = 10$ sides

(c)



Find the value of x (giving reasons)

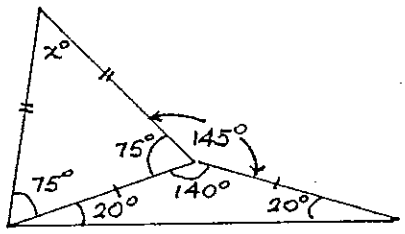
$y° = 40°$ (Corresponding $\angle$s)

But $x + y = 180$ (Straight line)

$\therefore x + 40 = 180$

$\therefore x = 140$

(d)



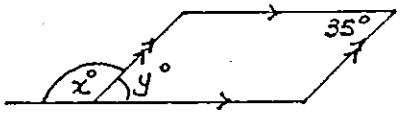
Find the value of x (without giving reasons)

$x + 150 = 180$

$\therefore x = 30$

(2) (Cont'd)

(e)



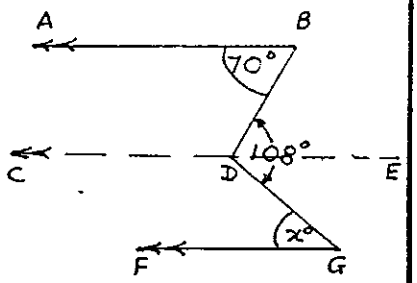
Find x (giving reasons)

$y = 35$ (Opp. $\angle$s of ||ogram)

$\therefore x + 35 = 180$ (Straight line)

$\therefore \underline{x = 145}$

(f)



Find $x°$ (giving reasons)

Draw CE || AB || FG

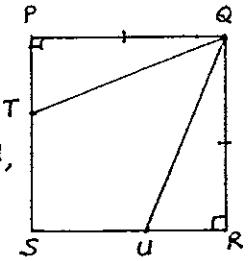
$\therefore \angle BDE = 70°$ (Alt. $\angle$s AB||CE)

$\therefore \angle EDG = 38°$

$\therefore \underline{x = 38}$ (Alt. $\angle$s CE || FG)

QUESTION 3 :- (10 marks)

(a)



PQRS is a square.

If $P\hat{Q}T = R\hat{Q}U$,

(i) Prove that Δs PQT, RQU are congruent.

In Δs PQT, RQU

$PQ = RQ$ (Sides of square)

$\angle QPT = \angle QRU$ ($\angle$s of a square) $= 90°$

$\angle PQT = \angle RQU$ (Data)

$\therefore \Delta PQT \equiv \Delta RQU$ (AAS)

(3)(a) (ii) Prove that

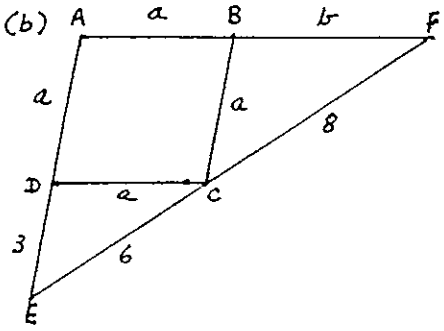
$ST = SU$

Since $PT = RU$ ($\Delta PQT \equiv \Delta RQU$)

$\therefore PS - PT = RS - RU$

$ST = SU$.

(b)



ABCD is a rhombus.

AD = a cm, DE = 3 cm,

CE = 6 cm, CF = 8 cm, BF = b cm.

Calculate the values of a and b.

$AB = BC = DC = a$ (sides of a rhombus)

Since ΔFBC III ΔFAE

then $\frac{a}{a+3} = \frac{8}{14}$

$\therefore 14a = 8(a+3)$

$\therefore 6a = 24$

$\underline{a = 4}$

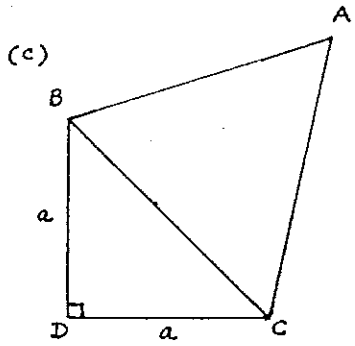
Similarly,

$\frac{b}{a} = \frac{8}{6}$ (Intercept Thm)

$\therefore \frac{b}{4} = \frac{8}{6}$

$b = \frac{8}{6_3} \times 4^2 = \underline{5\frac{1}{3}}$

(c)



Δ ABC is equilateral and has a perimeter of $30\sqrt{2}$ cm. Find the value of a.

(Hint: Use Pythagoras Theorem)

If ABC is equilateral, then

$BC = \frac{30\sqrt{2}}{3} = 10\sqrt{2}$

But $BC^2 = a^2 + a^2$ (Pythagoras Thm)

$= 2a^2$

$\therefore BC = \sqrt{2}\,a$

$\therefore 10\sqrt{2} = a\sqrt{2}$

$\therefore 10 = a$

$\underline{a = 10}$

QUESTION 4 : (6 marks)

(a) If $f(x) = \frac{x+1}{x-1}$

Find

(i) $f(0) = \frac{0+1}{0-1} = \underline{-1}$

(ii) $f(-1) = \frac{-1+1}{-1-1} = \underline{0}$

(iii) $f(a+1) = \frac{a+1+1}{a+1-1} = \underline{\frac{a+2}{a}}$

(b) Write down the natural domain of each of these functions

(i) $y = \frac{x^2}{2x+1}$

$2x + 1 \neq 0$

$2x \neq -1 \Rightarrow \underline{x \neq -\frac{1}{2}}$

(ii) $y = 3\sqrt{5x-2}$

$5x - 2 \geqslant 0$

$5x \geqslant 2 \Rightarrow \underline{x \geqslant \frac{2}{5}}$

(iii) $y = \sqrt{3-x} + \sqrt{x-1}$

$3 - x \geqslant 0$ and $x - 1 \geqslant 0$

$-x \geqslant -3$

$x \leqslant 3$ and $x \geqslant 1$

$\therefore \underline{1 \leqslant x \leqslant 3}$