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.

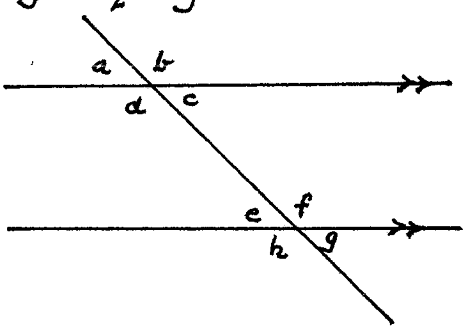
(c) Points that lie on the same straight line are called ____________ points.

(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.

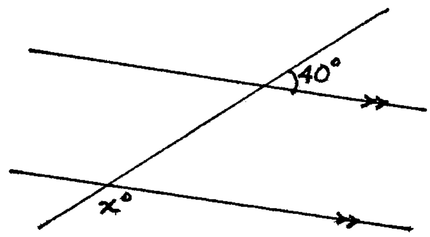
(j) Angles d and f are called ____________ angles.

QUESTION 2 :- (10 marks)

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

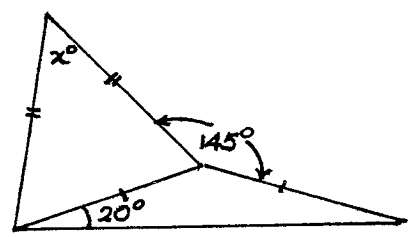
(b) If an interior angle of a regular polygon measures 144°, how many sides are there for the polygon?

(c)



Find the value of x (giving reasons)

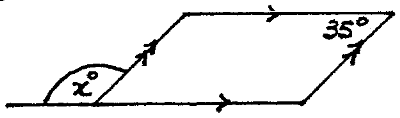
(d)



Find the value of x (without giving reasons)

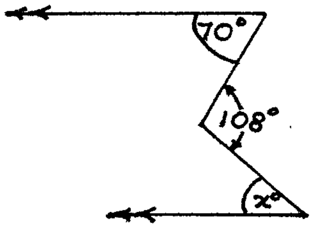
(2) (Cont'd)

(e)



Find x (giving reasons)

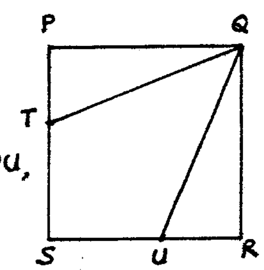
(f)



Find $x°$ (giving reasons)

QUESTION 3 :- (10 marks)

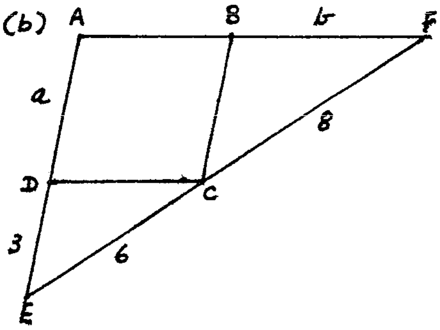
(a) PQRS is a square. If $P\hat{Q}T = R\hat{Q}U$,



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

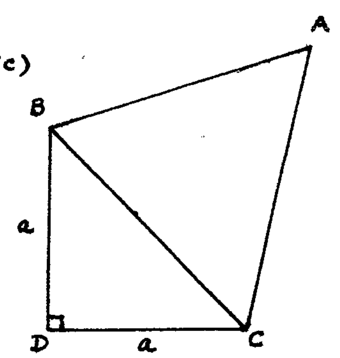
(3)(a)(ii) Prove that $ST = SU$

(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 <u>OBTUSE</u> angle lies between $90°$ and $180°$.

(b) An <u>ISOSCELES</u> triangle has two equal sides.

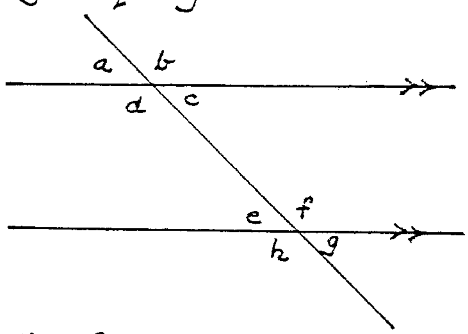
(c) Points that lie on the same straight line are called <u>COLLINEAR</u> points.

(d) <u>SUPPLEMENTARY</u> angles add up to $180°$.

(e) Lines that pass through a common point are called <u>CONCURRENT</u> lines.

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

(g) A <u>BISECTOR</u> of an angle divides the angle equally.



In the figure above,

(h) Angles a and e are called <u>CORRESPONDING</u> angles.

(i) Angles c and f are called <u>CO-INTERIOR</u> angles.

(j) Angles d and f are called <u>ALTERNATE</u> angles.

QUESTION 2 :- (10 marks)

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

Sum $= (2n-4) \times 90°$

$= (2\times 8 - 4)\times 90°$

$= 1080°$

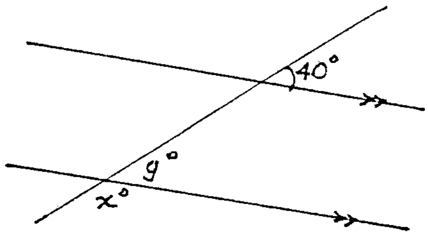
(b) If an interior angle of a regular polygon measures $144°$, how many sides are there for the polygon?

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

$\therefore 36 \times n = 360$

$\therefore \underline{n = 10}$ sides

(c)



Find the value of x (giving reasons)

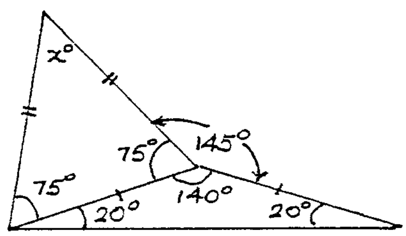
$y° = 40°$ (Corresponding $\angle$s)

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

$\therefore x + 40 = 180$

$\therefore \underline{x = 140}$

(d)



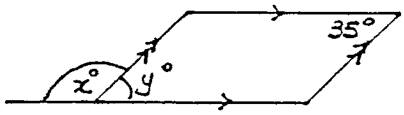
Find the value of x (without giving reasons)

$x + 150 = 180$

$\therefore \underline{x = 30}$

(2) (Cont'd)

(e)



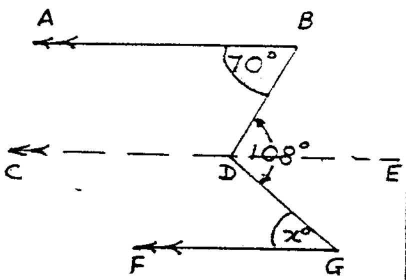
Find x (giving reasons)

$y = 35$ (Opp. ∠s of ‖ogram)

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

$\therefore \underline{x = 145}$

(f)



Find $x°$ (giving reasons)

Draw CE ‖ AB ‖ FG

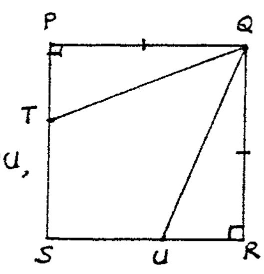
$\therefore \angle BDE = 70°$ (Alt. ∠s AB‖CE)

$\therefore \angle EDG = 38°$

$\therefore \underline{x = 38}$ (Alt. ∠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)

∠QPT = ∠QRU (∠s of a square) = 90°

∠PQT = ∠RQU (Data)

∴ ΔPQT ≡ ΔRQU (AAS)

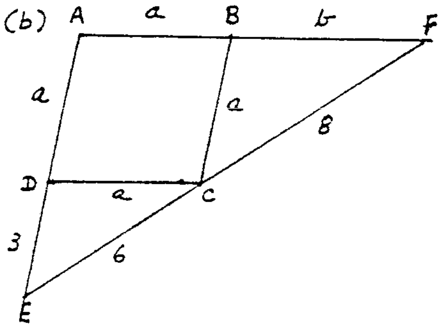
(3)(a)(ii) Prove that ST = SU

Since PT = RU (ΔPQT ≡ ΔRQU)

∴ 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 ||| ΔFAE

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

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

$\therefore 6a = 24$

$\underline{a = 4}$

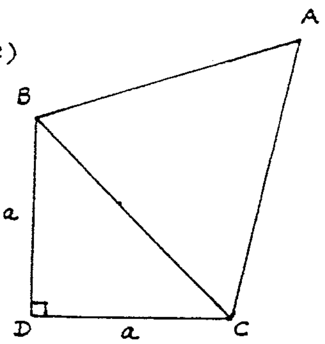
Similarly,

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

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

$b = \dfrac{8}{6} \times 4 = \underline{5\tfrac{1}{3}}$

(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

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

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

Find

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

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

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

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

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

$2x + 1 \neq 0$

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

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

$5x - 2 \geq 0$

$5x \geq 2 \Rightarrow \underline{x \geq \tfrac{2}{5}}$

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

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

$-x \geq -3$

$x \leq 3$ and $x \geq 1$

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