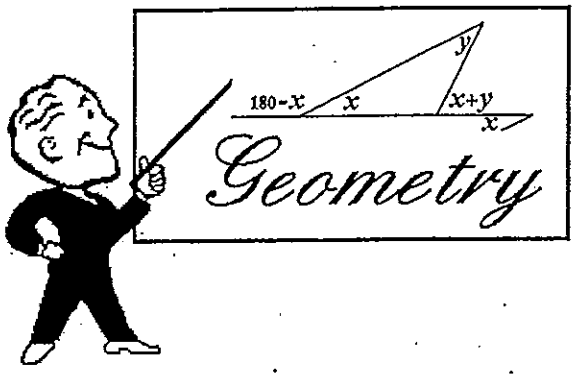


The word "*Geometry*" means "*Earth Measure*".

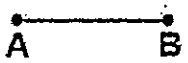
'*Plane geometry*' deals with the study of 2-dimensional (flat) figures.
It deals with all of the properties and measurements associated with them.
We study their shapes and sizes, and calculate lengths, angles and areas.

This section will also cover measurements for 3 dimensional figures (solids).

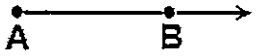
Geometric Terms and Figures:

A *point* , P, has only position and has NO size.

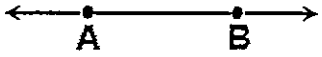
An *interval* , AB, is the shortest path between 2 points A and B.



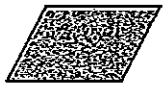
A *ray* , AB, is an interval extended infinitely in one direction.



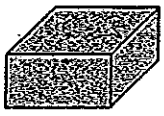
A *line* , AB, is an interval extended infinitely in both directions.



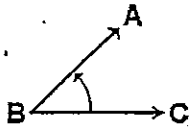
A *plane* is a 2-Dimensional "flat" figure, which has an area.



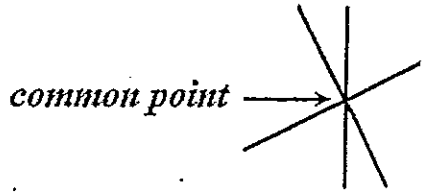
A *solid* is a 3-Dimensional object, which has a volume.



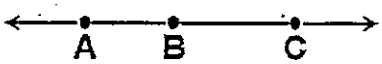
An *angle* ∠ABC is formed when an interval is rotated about one end.
- the rays BA and BC are called the "arms" of the angle.



Two or more lines are said to be *concurrent* if they *intersect* (meet) at the one common point.

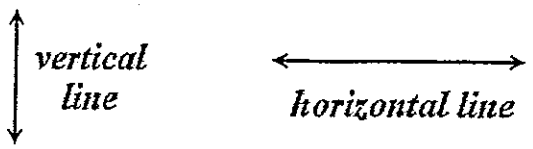


Points are said to be *collinear* if they are on the same line.

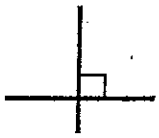


ypes of Lines:

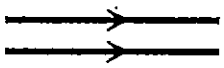
'ertical and *horizontal* lines:



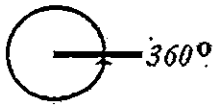
'erpendicular lines – lines which meet at right angles (90°).



'arallel lines – lines which head in the same direction.
Co-planar lines which never meet.

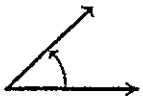


ll measurements require a "*unit of measurement*" associated with them.
or angles this is called the "degree" – 360° (degrees) make one *revolution*.

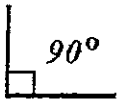


ypes of Angles:

n *acute angle* – is an angle less than 90°.



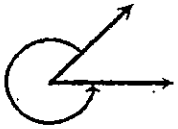
right angle – is a quarter of a revolution. ie 90° .



n *obtuse angle* – is an angle between 90° and 180°.

straight angle – is half of a revolution. So it is 180°.

reflex angle – is any angle between 180° and 360°.

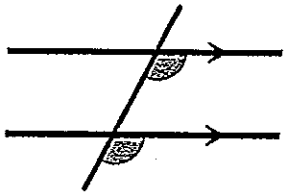


djacent angles – angles that are "next to" each other.

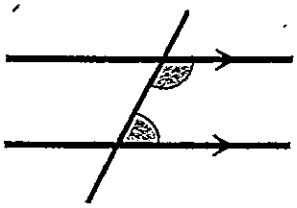
omplementary angles – add up to 90°. *Supplementary angles* – add up to 180°.

ertically Opposite Angles are Equal

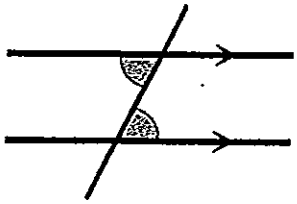
Corresponding Angles are Equal



-interior Angles are Supplementary

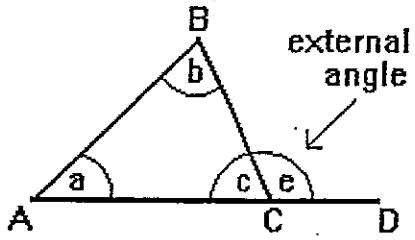


Alternate Angles are Equal



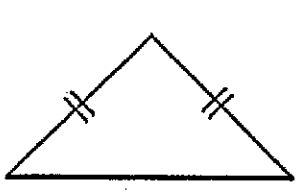
PLANE FIGURES

TRIANGLES

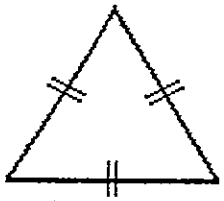


$a+b+c=180^0$

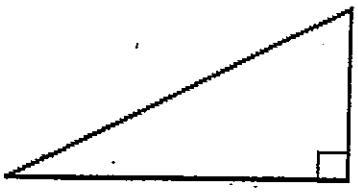
- Any three sided *closed* plane figure is called a *triangle*.
  (*"tri"* means "three" and thus "3 angles")
- The *angle-sum* of all triangles is 180°.
- The 3 angles formed inside a triangle are called *internal angles*.
- Any angle formed outside a triangle is called an *external angle*.
- There are a number of different types of triangles:-



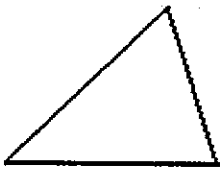
Isosceles triangle



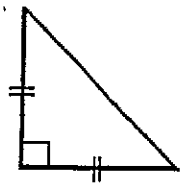
Equilateral triangle



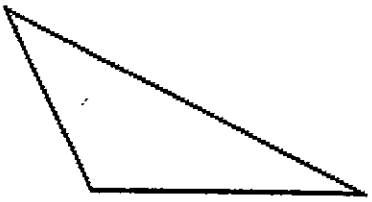
Right angle triangle



Scalene triangle

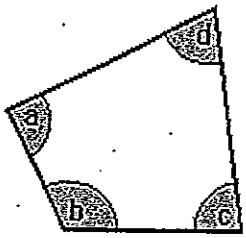


Right isosceles triangle



Obtuse angled triangle

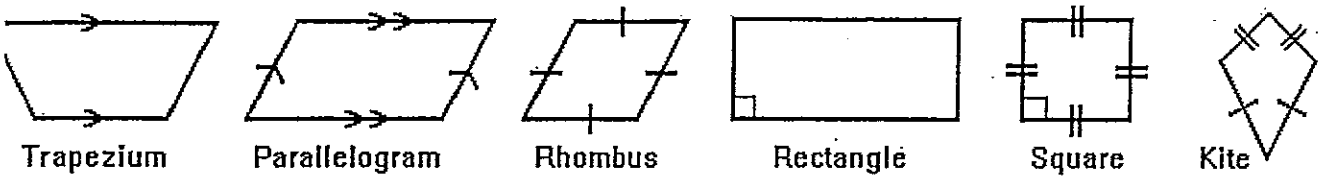
QUADRILATERALS



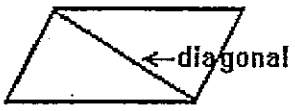
$a+b+c+d=360^0$

- Any four sided closed plane figure is called a *quadrilateral*.
  (*"quad"* means "four" and *"lateral"* means "sides")
- The *angle-sum* of all quadrilaterals is 360°.
- There are a number of different types of quadrilaterals:-

ypes of Quadrilaterals:



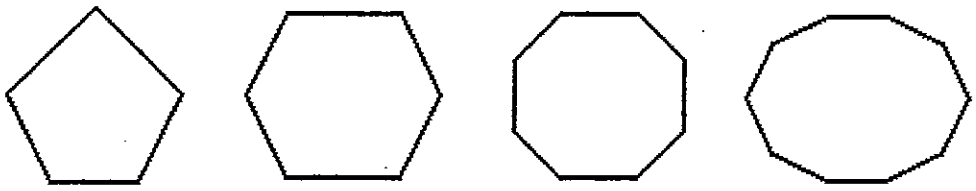
A *trapezium* has only one pair of parallel sides.
A *parallelogram* has 2 pairs of opposite sides parallel.
A *rhombus* has all 4 sides equal.
A *rectangle* has 2 pairs of parallel sides and a right angle.
A *square* has 4 sides equal and a right angle.
A *kite* has 2 pairs of adjacent sides equal.



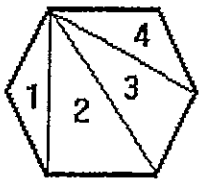
The point where any 2 sides meet is called a *vertex* - (plural is "vertices").
A *diagonal* is any line that joins 2 vertices on opposite sides of the figure.

OLYGONS

I plane figures made up of straight lines are called "polygons".
As the number of sides (intervals) varies so do their names.
If the polygon is a closed plane figure and all the sides and angles are equal, then it is called a *regular polygon*.
Some common polygons and their names are shown below:



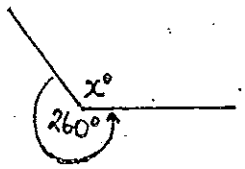
To calculate the sum of the internal angles of any polygon, join one vertex to all other vertices of the polygon, forming a number of triangles.
The angle-sum of the polygon then = 180° × the number of triangles formed.



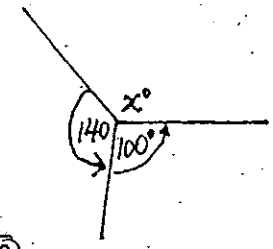
Angle-sum
$= 4 \times 180^{0} = 720^{0}$

LESSON 17 — HOMEWORK

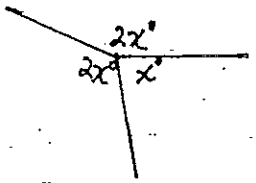
6992.T



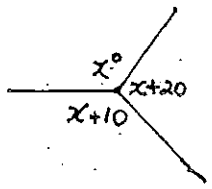
① $x =$



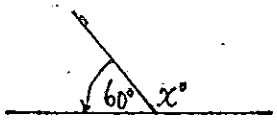
② $x =$



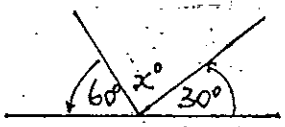
③ $x =$



④ $x =$



⑤ $x =$



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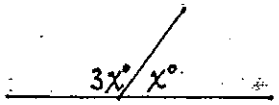

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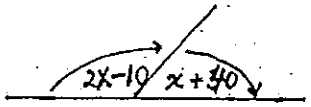

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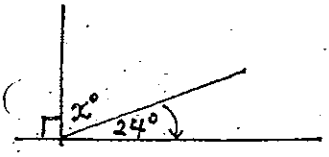

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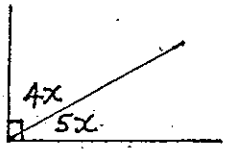
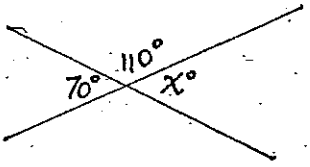


⑩ $x =$



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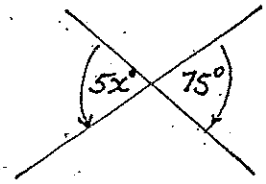

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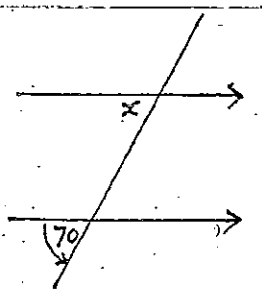

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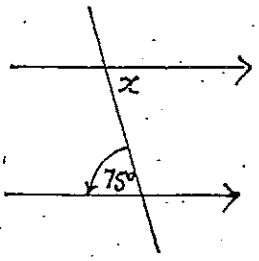

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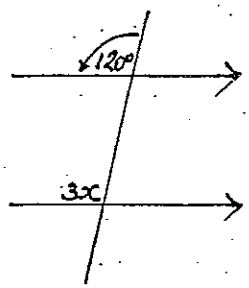

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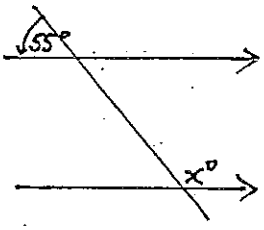

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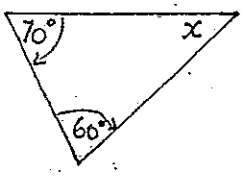

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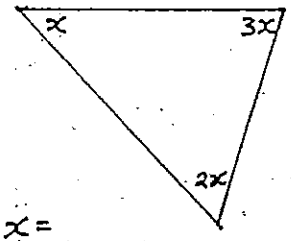

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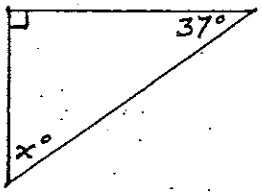

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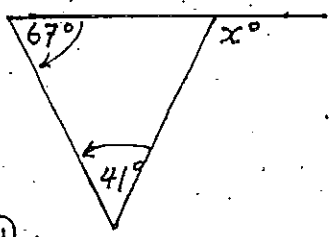

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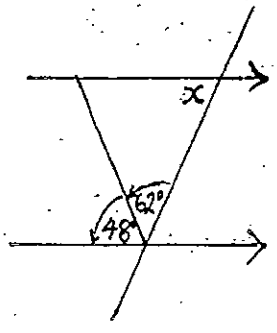

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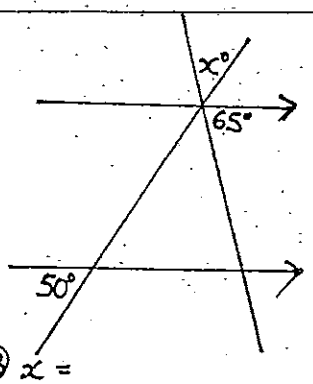

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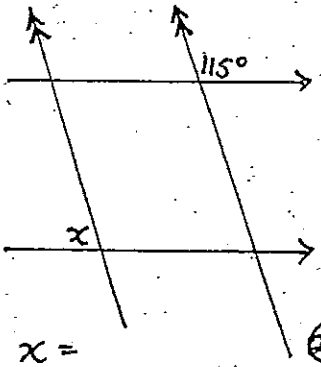
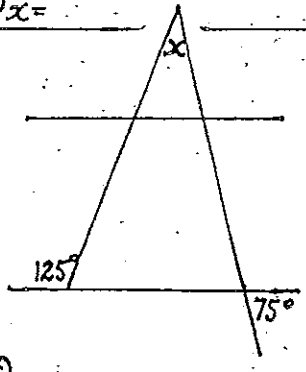


㉔ $x =$



㉕ $x =$

ANSWERS

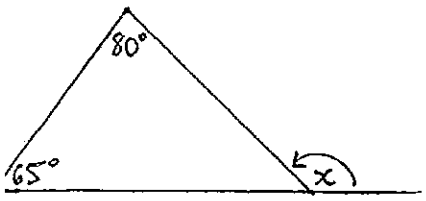
FIND x in all the above diagrams

① 100° ② 120° ③ 22° ④ 110° ⑤ 120° ⑥ 90° ⑦ 45° ⑧ 50° ⑨ 66° ⑩ 10° ⑫ 70° ⑬ 15°
⑭ 70° ⑮ 75° ⑯ 40° ⑰ 125° ⑱ 50 ⑲ 30° ⑳ 53° ㉑ 105° ㉒ 70° ㉓ 65° ㉔ 65° ㉕ 50°

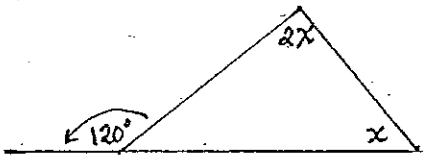
Lesson (18) – Tutorial Sheet

T P C.

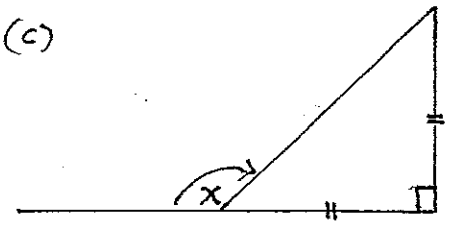
Test ① – Find x.



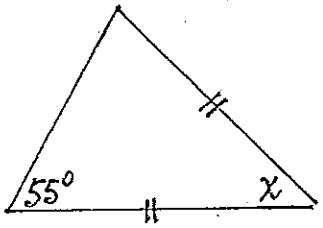
(b)



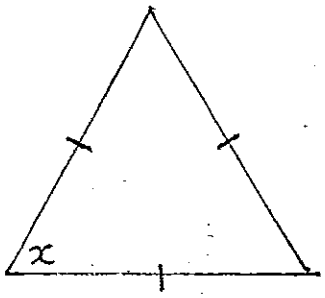
(c)



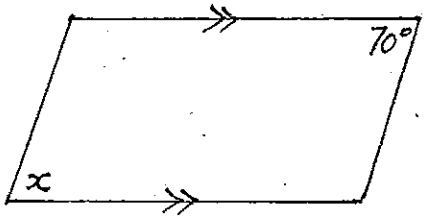
Test ② – Find x



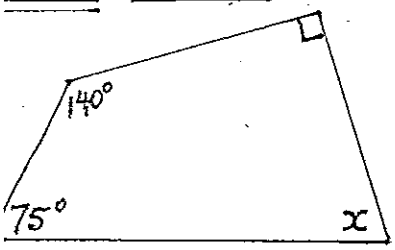
(b)



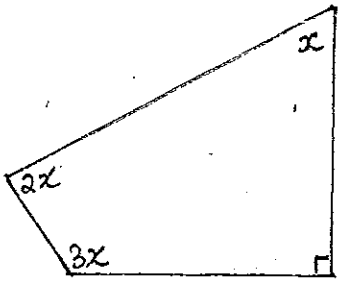
(c)



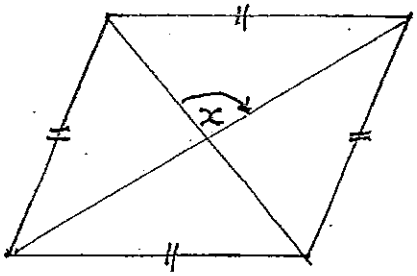
Test ③ – Find x



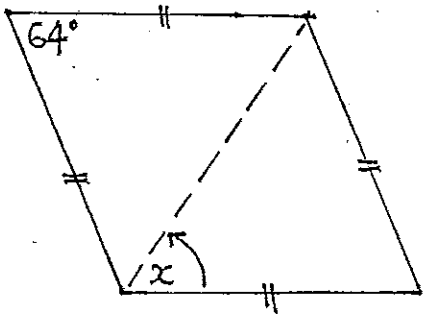
(b)



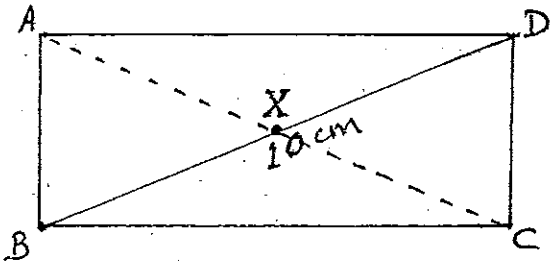
(c)



Test ④



(b)



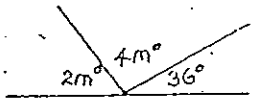
ABCD is a rectangle
AC meets BD at X
BD = 10 cm
Find (i) BX (ii) AC

ANSWERS: (1) a) 145° b) 40° c) 135° (3) a) 55° b) 45° c) 90°
(2) a) 70° b) 60° c) 70° (4) a) 58° b) (i) 5cm (ii) 10cm.

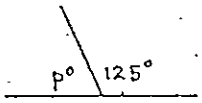
11-1 Angles on a Straight Line – total 180° WORKSHEET

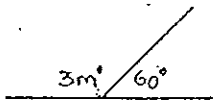
Find the value of the pronumeral in the diagrams below:-

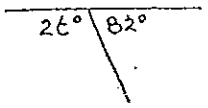
Example

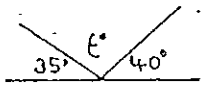


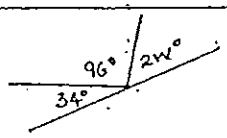
2m+4m+36 = 180
6m+36 = 180
6m = 144
m = 24

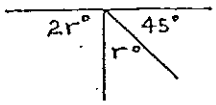
a) 

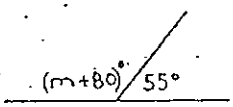
b) 

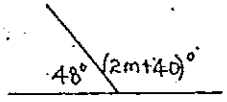
c) 

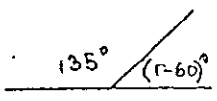
d) 

e) 

f) 

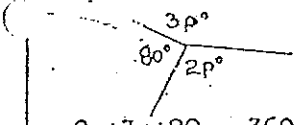
g) 

h) 

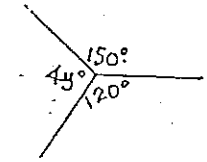
i) 

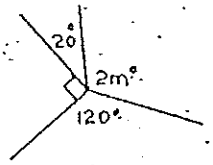
11-2 Angles at a Point – total 360° Find the value of the pronumeral in each of the following:-

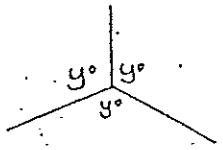
Example

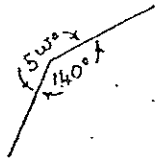


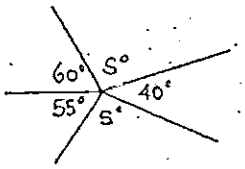
2p+3p+80 = 360
5p+80 = 360
5p = 280
p = 56

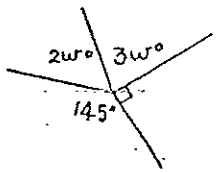
a) 

b) 

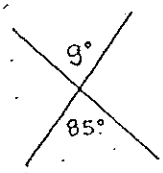
c) 

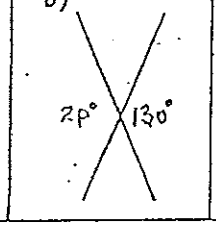
d) 

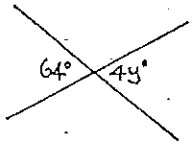
e) 

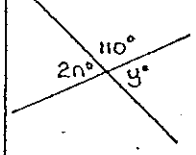
f) 

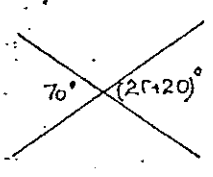
11-3 Vertically Opposite Angles – are equal. Determine the value of the pronumerals

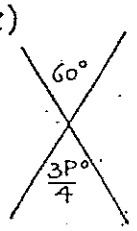
a) 

b) 

c) 

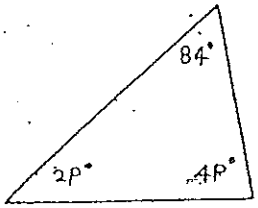
d) 

e) 

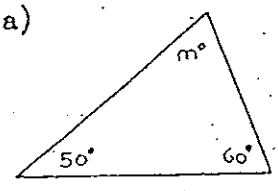
f) 

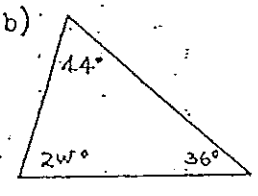
11-4 Angles in a Triangle: total 180°. Find the value of the pronumeral in each case:

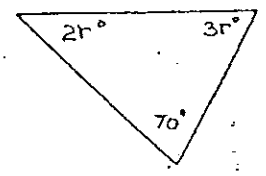
Example

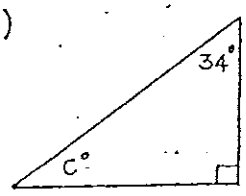


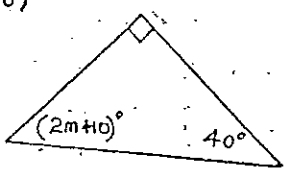
2p+4p+84 = 180
6p+84 = 180
6p = 96
p = 16

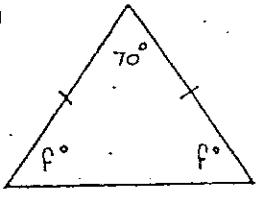
a) 

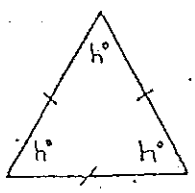
b) 

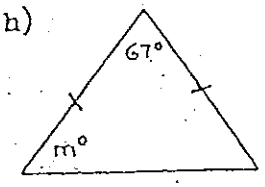
c) 

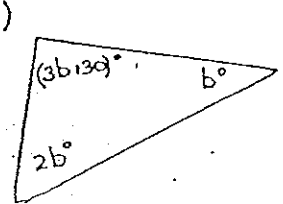
d) 

e) 

f) 

g) 

h) 

i) 

ANSWERS: 11-1 a) 55° b) 40° c) 49° d) 105° e) 25° f) 45° g) 45° h) 46° i) 105° 11-2 a) 125° b) 65° c) 120° d) 44° e) 102.5° f) 25° 11-3 a) 85° b) 65° c) 16° d) 70° & 35° e) 25° f) 80° 11-4 a) 70° b) 50° c) 22° d) 56° e) 20° f) 55° g) 60° h) 56.5° i) 30°

X TRANSVERSALS.

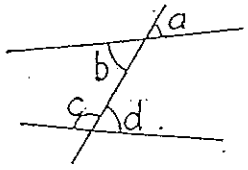


Fig. 7.

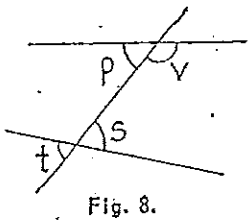
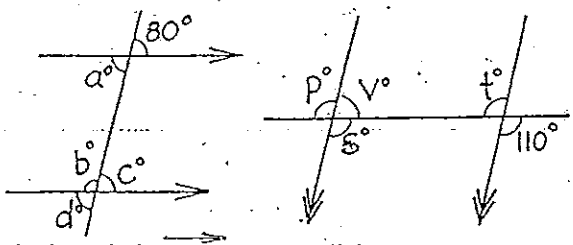


Fig. 8.

Place the appropriate pairs of letters opposite the name of the angles listed below.

	Fig. 7	Fig. 8
57. ALTERNATE	.....and.....	.....and.....
58. CORRESPONDING	.....and.....	.....and.....
59. CO-INTERIOR or ALLIED	.....and.....	.....and.....
60. VERTICALLY OPPOSITE	.....and.....	.....and.....
61. ADJACENT	.....and.....	.....and.....

XI PARALLEL LINES PROBLEMS.



Lines marked → are parallel.

Write down the value of each of the following angles.

62. a=..... t=.....

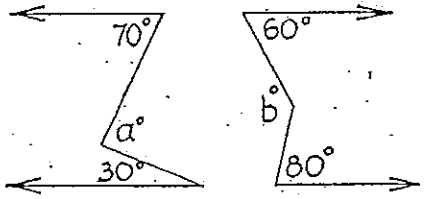
63. b=..... v=.....

64. c=..... s=.....

65. d=..... p=.....

In questions 66 to 72 write down the value of a and b.

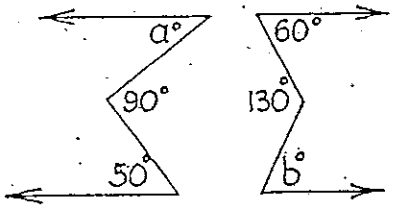
66.



a=.....

b=.....

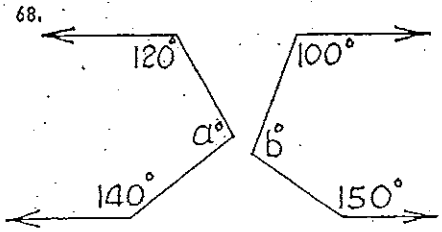
67.



a=.....

b=.....

68.

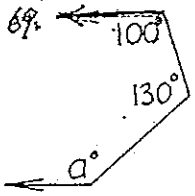


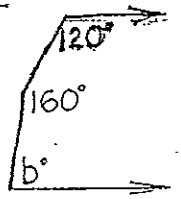
a=.....

b=.....

Class Exercises

69.

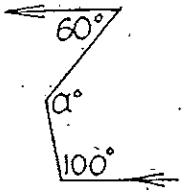


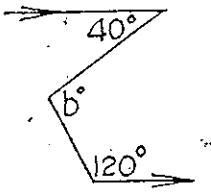


a=.....

b=.....

70.

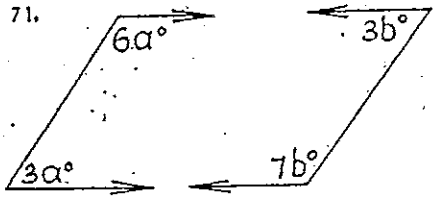




a=.....

b=.....

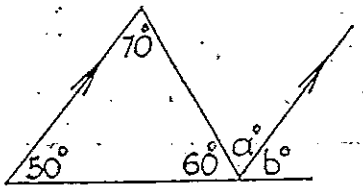
71.



a=.....

b=.....

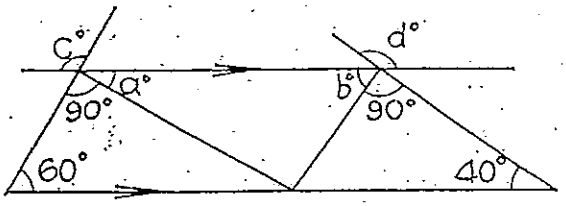
72.



a=.....

b=.....

* * * * * * *



Write down the value of each of the following angles.

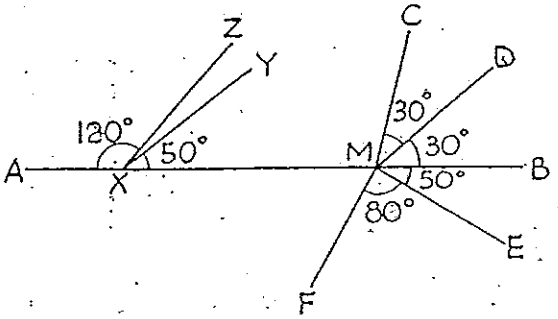
73. a= .....

b= .....

74. c= .....

d= .....

* * * * * * *



75. In the above figure AB is a straight line. If the angles had been drawn accurately, which line would be parallel with

XY .....

XZ .....