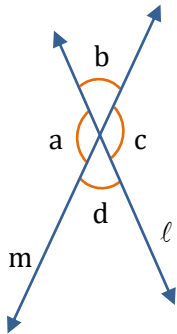


NCERT QUESTIONS WITH SOLUTIONS

FIGURE IT OUT-01

1. List all the linear pairs and vertically opposite angles you observe in.



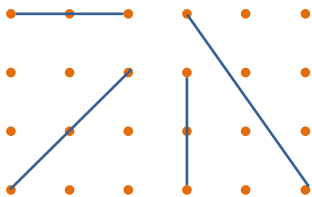
Linear Pairs	$\angle a$ and $\angle b$, ...
Pairs of Vertically Opposite Angles	$\angle b$ and $\angle d$, ...

Sol.

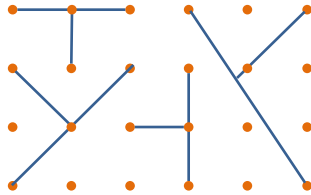
Linear Pairs	$\angle a$ and $\angle b$, $\angle b$ and $\angle c$, $\angle c$ and $\angle d$, $\angle d$ and $\angle a$
Pairs of Vertically Opposite Angles	$\angle b$ and $\angle d$, $\angle a$ and $\angle c$

FIGURE IT OUT-02

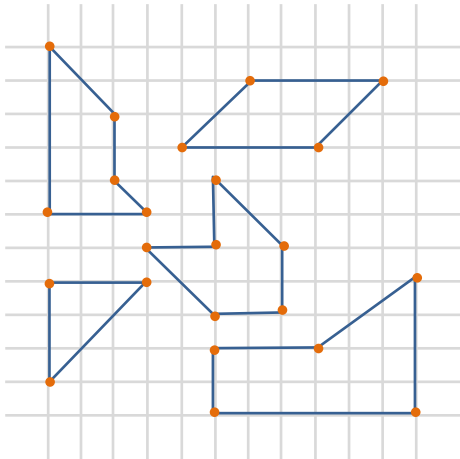
1. Draw some lines perpendicular to the lines given on the dot paper in Fig.



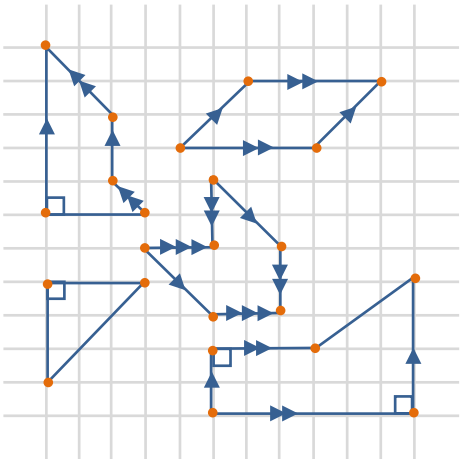
Sol.



2. In Fig. 5.11, mark the parallel lines using the notation given above (single arrow, double arrow etc.). Mark the angle between perpendicular lines with a square symbol.
- (a) How did you spot the perpendicular lines?
- (b) How did you spot the parallel lines?



Sol.



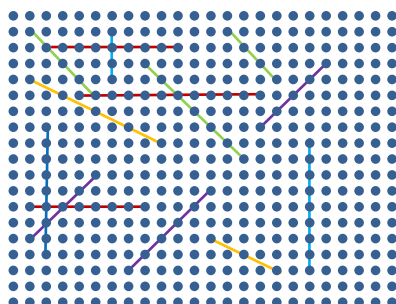
(a) To spot perpendicular lines in a geometric figure, observe if lines intersect at 90° .

(b) To spot parallel lines in a geometric figure, observe if lines never intersect at any point.

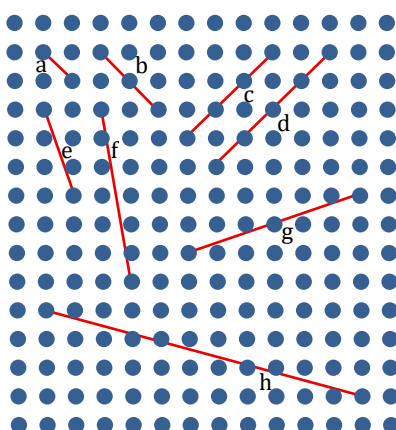
3. In the dot paper following, draw different sets of parallel lines.

The line segments can be of different lengths but should have dots as endpoints.

Sol. Let's draw some lines on a dot paper

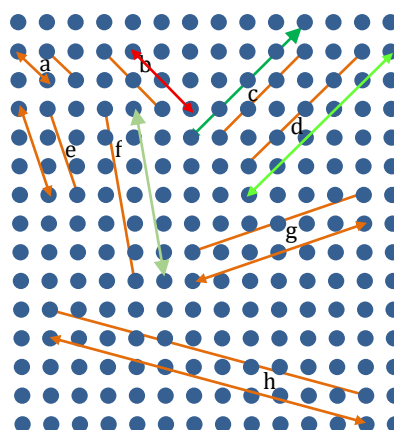


4. Using your sense of how parallel lines look, try to draw lines parallel to the line segments on this dot paper.

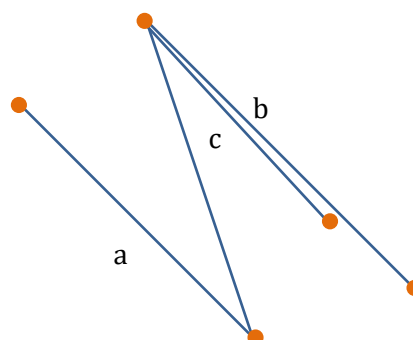


- (a) Did you find it challenging to draw some of them?
 (b) Which ones?
 (c) How did you do it?

Sol.



- (a) Yes, it can be more challenging to intuitively draw lines parallel to some of the segments compared to others.
- (b) The most challenging lines are typically those with less common slopes, like g and h, because it's harder to judge their angle by eye compared to simple horizontal, vertical, or 45-degree lines.
- (c) The best ways to draw a parallel line on the dot paper is to count the dot pattern (the "slope"). For example, line c goes 'up 1 dot and right 2 dots'. To draw a parallel line, you simply start at a new dot and repeat that same 'up 1, right 2' movement.
5. In Figure which line is parallel to line a, line b or line c? How do you decide this?

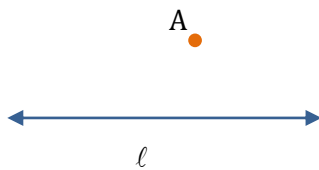


Sol. In the given figure, "Line a is parallel to line c because they lie in the same plane and do not intersect, regardless of how far they are extended."

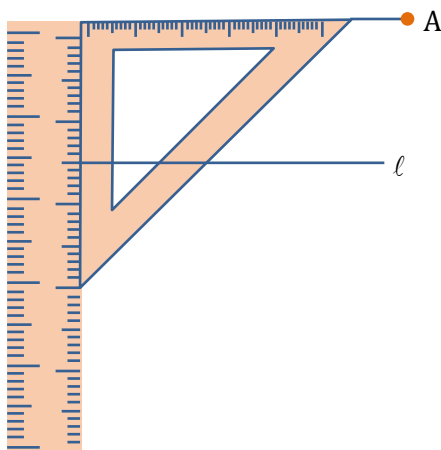
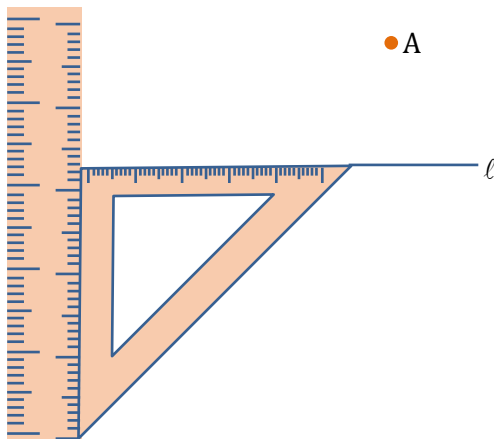
We notice that by extending both lines and noticing that they never meet.

FIGURE IT OUT-03

1. Can you draw a line parallel to l , that goes through point A? How will you do it with the tools from your geometry box? Describe your method.



Sol. Tools needed : Ruler, Set-squares (right-angled triangle), Pencil

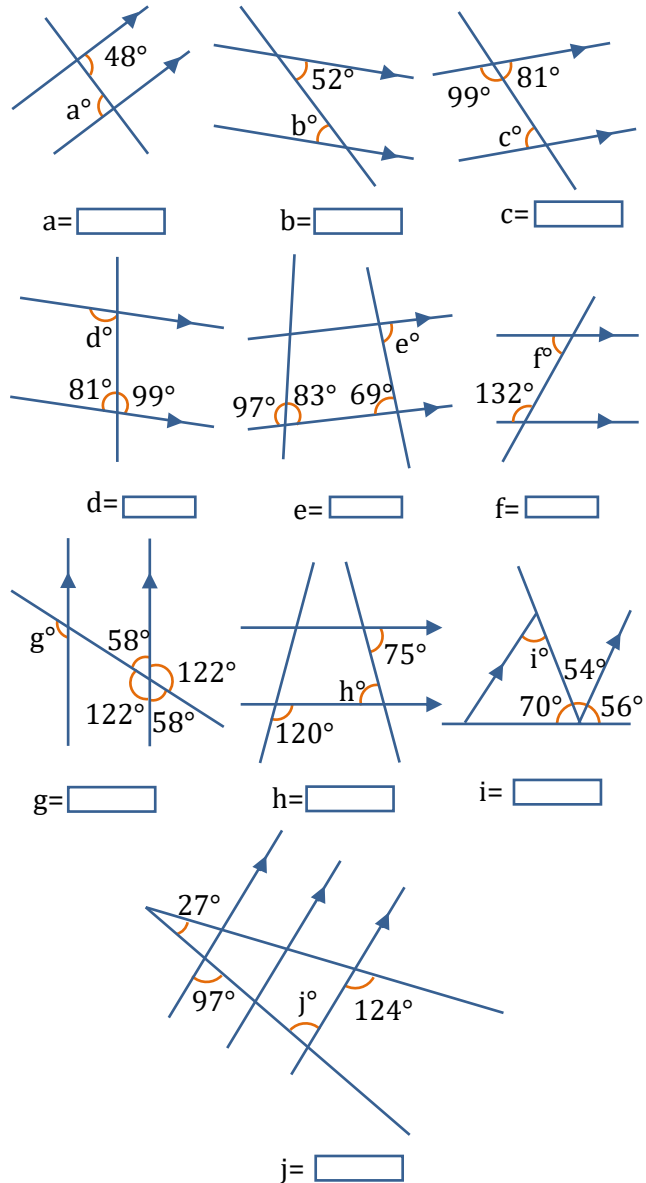


Steps:

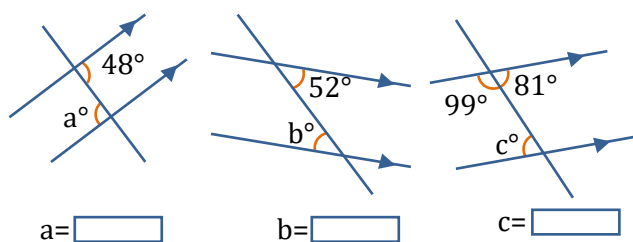
1. Place the set square so that one side is along the line l .
2. Hold the ruler against the other side of the set square (the ruler won't move).
3. Slide the set square along the ruler until one side reaches point A.
4. Draw a line along the edge of the set square through point A.
5. This new line is parallel to line l and passes through point A.

FIGURE IT OUT-04

1. Find the angles marked below.



Sol.



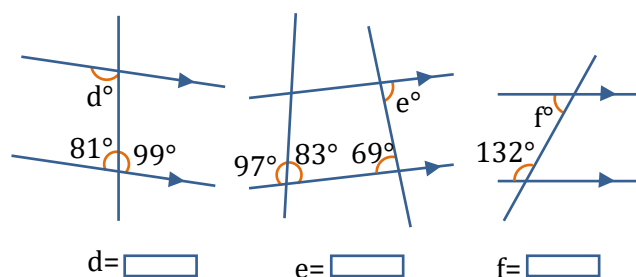
Since alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other. Therefore, $a = 48^\circ$

Since alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other. Therefore, $b = 52^\circ$.

The sum of co interior angles on the same side of the transversal always adds up to 180° .

$$\text{So, } 180^\circ - 99^\circ = 81^\circ.$$

Therefore, $c = 81^\circ$.



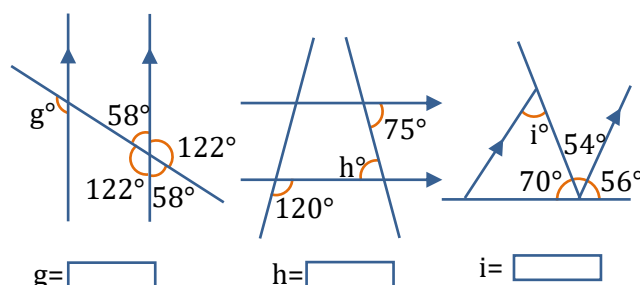
The sum of the interior angles on the same side of the transversal always adds up to 180° .

$$\text{So, } 180^\circ - 81^\circ = 99^\circ. \text{ Therefore, } d = 99^\circ.$$

Alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other.

Therefore, $e = 69^\circ$.

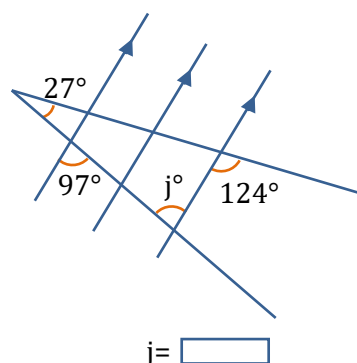
The sum of the interior angles on the same side of the transversal always adds up to 180° . So, $180^\circ - 132^\circ = 48^\circ$. Therefore, $f = 48^\circ$.



Corresponding angles formed by a transversal intersecting a pair of parallel lines are always equal to each other. Therefore, $g = 122^\circ$.

Alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other. Therefore, $h = 75^\circ$.

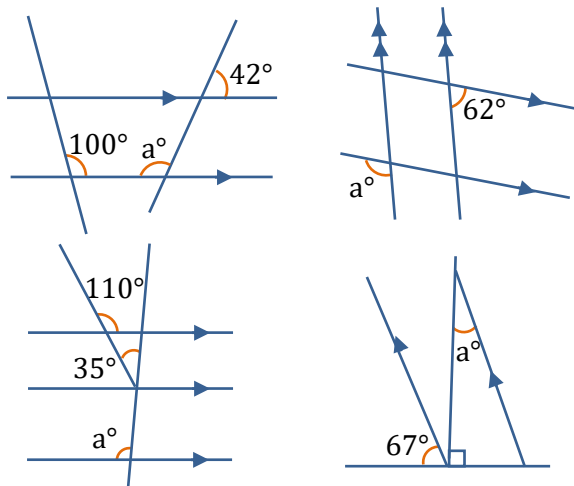
Alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other. Therefore, $i = 54^\circ$.



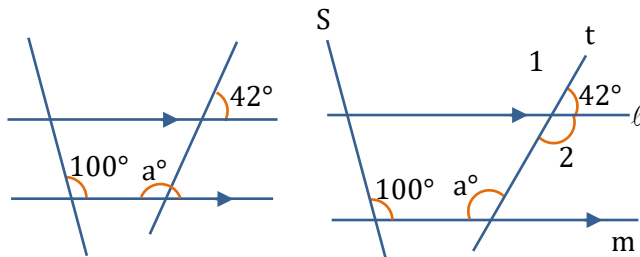
Alternate interior angles formed by a transversal intersecting a pair of parallel lines are always equal to each other.

Therefore, $j = 97^\circ$.

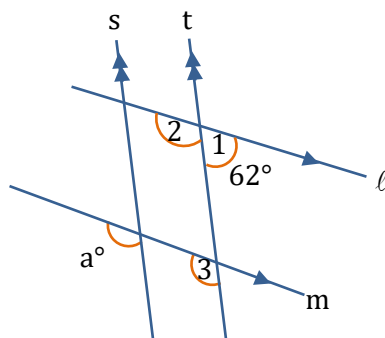
2. Find the angle represented by a .



Sol.

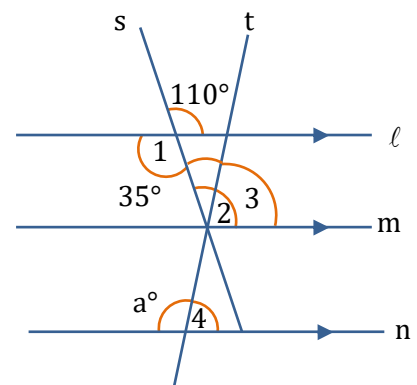


Here, $\angle 1$ is 42° , so $\angle 2 = 180^\circ - 42^\circ = 138^\circ$, ($\angle 1$ and $\angle 2$ form a linear pair)
Now, since lines l and m are parallel and t is a transversal.
Therefore, $\angle 2 = a$ (alternate angles are equal)
Thus, $a = 138^\circ$



Here, $\angle 1 = 62^\circ$
So, $\angle 1 + \angle 2 = 180^\circ$
($\angle 1$ and $\angle 2$ form a linear pair)
 $\angle 2 = 180^\circ - 62^\circ = 118^\circ$
Now, $\angle 2 = \angle 3$
(corresponding angles are equal)
So, $\angle 3 = 118^\circ$
Now, $\angle 3 = a$
(corresponding angles are equal)

Thus, $a = 118^\circ$



Here, lines s and l are intersecting lines.
So, $\angle 1 = 110^\circ$

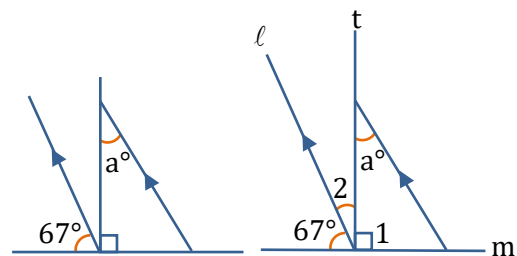
[Vertically opposite angles]

And $\angle 1 = \angle 2 = 110^\circ$ because lines l and m are parallel and line s is a transversal.
Therefore $\angle 3 = \angle 2 - 35^\circ = 110^\circ - 35^\circ = 75^\circ$
Also,

$\angle 3 = \angle 4 = 75^\circ$ [Corresponding angles]

So, $a^\circ = 180^\circ - 75^\circ = 105^\circ$

[Linear pair angles]



Using angles on a straight line, we have

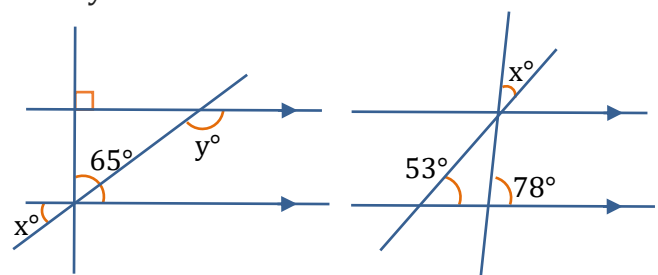
$$\angle 1 + \angle 2 + 67^\circ = 180^\circ$$

$$\angle 2 = 180^\circ - 67^\circ - 90^\circ$$

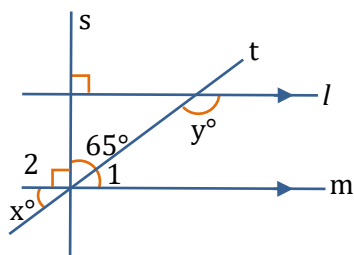
$$\angle 2 = 23^\circ \quad [\text{Since } \angle 1 = 90^\circ]$$

Thus, $a = 23^\circ$ as $\angle 2 = \angle a$ [Alternate angles as lines l and t are parallel]

3. In the figures below, what angles do x and y stand for ?



Sol.



Since lines s and m are perpendicular to each other.

So $\angle 2 = 90^\circ$ Now, $\angle 2 + 65^\circ + x^\circ = 180^\circ$
[Linear Pair]

So, $x^\circ = 180^\circ - 90^\circ - 65^\circ = 25^\circ$

Now, lines t and m are two intersecting lines.

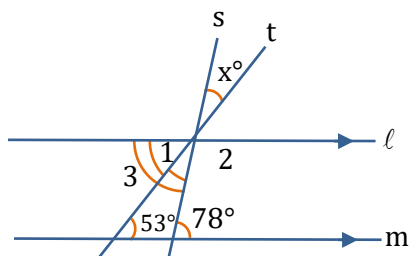
So, $x = \angle 1 = 25^\circ$ [Vertically Opposite Angles]

Lines l and m are parallel to each other, and t is a transversal.

So, $y^\circ = \angle 2 + 65^\circ = 90^\circ + 65^\circ = 155^\circ$

[Alternate angles]

Therefore, $y = 155^\circ$.



Since lines l and m are parallel and line s is a transversal.

So, $\angle 3 = 78^\circ$ [Alternate Angles]

Also, lines l and m are parallel, and line t is a transversal.

So, $\angle 1 = 53^\circ$ [Alternate Angles]

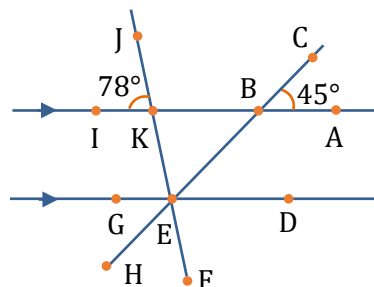
Therefore, $\angle 2 = \angle 3 - \angle 1 = 78^\circ - 53^\circ = 25^\circ$

Lines s and t are intersecting lines.

Therefore, $x^\circ = \angle 2 = 25^\circ$

[Vertically Opposite Angles]

4. In Fig. $\angle ABC = 45^\circ$ and $\angle IKJ = 78^\circ$. Find angles $\angle GEH$, $\angle HEF$, $\angle FED$.



- Sol. Line segments IA and HC intersect at point B .

So, $\angle ABC = \angle KBE = 45^\circ$

[Vertically Opposite Angles]

Similarly, line segments JF and IA intersect at point K .

So, $\angle IKJ = \angle BKE = 78^\circ$

[Vertically Opposite Angles]

$\angle KBE = \angle GEH = 45^\circ$

[Corresponding Angles]

Similarly, $\angle BKE = \angle FED = 78^\circ$

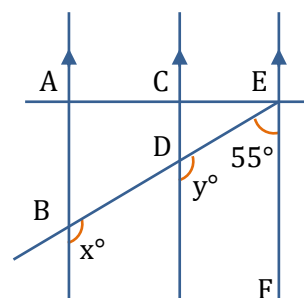
[Corresponding Angles]

Now, $\angle GEH + \angle HEF + \angle FED = 180^\circ$

[Linear Pair]

$\angle HEF = 180^\circ - 45^\circ - 78^\circ = 57^\circ$

5. In Fig. AB is parallel to CD and CD is parallel to EF . Also, EA is perpendicular to AB . If $\angle BEF = 55^\circ$, find the values of x and y .



Sol. Given AB is parallel to CD and CD is parallel to EF.

So, AB is parallel to EF.

Now, EF is parallel to CD, and DE is a transversal.

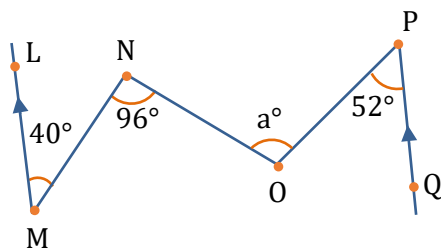
So, $y^\circ + 55^\circ = 180^\circ$ [Sum of interior angles]

$$y = 125^\circ$$

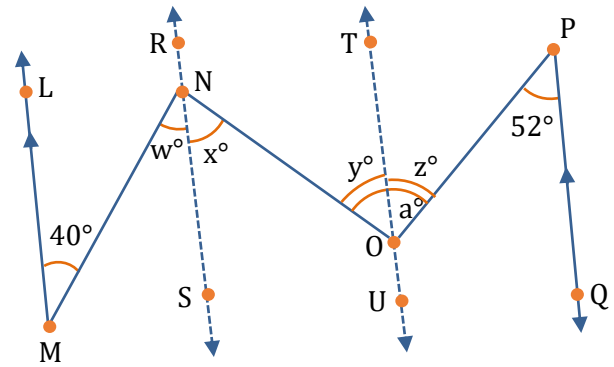
Now, AB is parallel to CD, and BD is a transversal.

So, $x^\circ = y^\circ = 125^\circ$ [Corresponding Angles]

6. What is the measure of angle $\angle NOP$ in Fig. given that $LM \parallel PQ$.



Sol. Draw a line RS through N, which is parallel to line LM, and line TU through O, which is parallel to line PQ.



$\angle LMN = \angle MNS$ [Alternate Angles]

Therefore, $w^\circ = 40^\circ$

Given, $\angle MNO = 96^\circ$

$$w^\circ + x^\circ = 96^\circ$$

$$x^\circ = 96^\circ - 40^\circ = 56^\circ$$

Now, RS is parallel to TU, and NO is a transversal.

So, $\angle SNO = \angle NOT$ [Alternate Angles]

Therefore, $y^\circ = x^\circ = 56^\circ$

Now TU is parallel to PQ, and OP is a transversal.

So, $\angle TOP = \angle OPQ$ [Alternate Angles]

$$z^\circ = 52^\circ \text{ [Given } \angle OPQ = 52^\circ]$$

$$\text{Thus, } a^\circ = y^\circ + z^\circ = 56^\circ + 52^\circ = 108^\circ$$