Introduction to Euclid's Geometry

CHAPTER 5

TRY YOURSELF SOLUTIONS

1. Age of John = Age of Ram
[∵ Euclid axiom 1 : Things which are equal to the same thing are equal to one another]

2. Given, $y - 24 = 35$
$\Rightarrow$ $y - 24 + 24 = 35 + 24$ [Using Euclid's axiom 2]
$\Rightarrow$ $y = 59$

3. Given, $x + 7 = 13$
$\Rightarrow$ $x + 7 - 7 = 13 - 7$ [Using Euclid's axiom 3]
$\Rightarrow$ $x = 6$

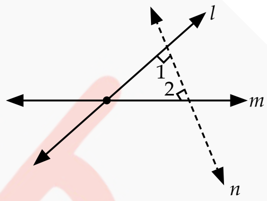
4. Given, $x = 8$ ...(i)
and $y = 3$ ... (ii)
On adding (i) and (ii), we get
$x + y = 11$ [Using Euclid's axiom 2]

5. In a circle having centre at P, we have
$PR = PQ$ = radius of circle
Also, in a circle having centre at Q, we have
$QR = PQ$ = radius of circle.
Now, by using Euclid's first axiom; things which are equal to the same things are equal to one another, we get
$PR = PQ = QR$.

6. Given, $AC = DC$ ...(i)
and $CB = CE$ ...(ii)
Adding, (i) and (ii), we get $AC + CB = DC + CE$
[Using Euclid's axiom 2]
$\Rightarrow$ $AB = DE$ [Using Euclid's axiom 4]

7. Euclid's 3rd postulate states that a circle can be drawn with any centre and any radius. Yes, there are terms like circle, radius and centre that need to be defined first.

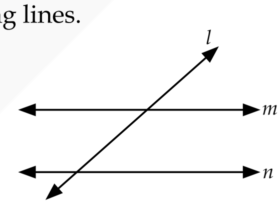
8. Suppose there are two intersecting lines l and m which are perpendicular to the same line n as shown in figure.



Clearly $\angle 1 + \angle 2 = 180°$
But according to Euclid's 5 postulate the lines can not intersect unless $\angle 1 + \angle 2 < 180°$.
So, our supposition is wrong.
Hence, the two intersecting lines cannot be perpendicular to the same line.

9. Yes, given statement is an equivalent version of Euclid's 5th postulate.

10. Three lines l, m, n are given in the same plane such that l intersects m and $n \parallel m$.
If possible let l and n be non-intersecting lines. Then, $l \parallel n$.
But, $n \parallel m$
∴ $l \parallel n$ and $n \parallel m \Rightarrow m \parallel l$ which means l and m are non-intersecting lines.



This is a contradiction to the hypothesis that l and m are intersecting lines. So, our supposition is wrong. Hence, line l intersects line n.