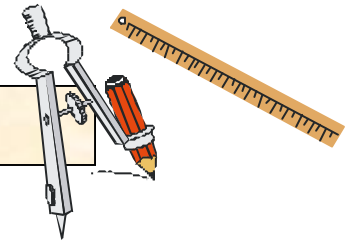


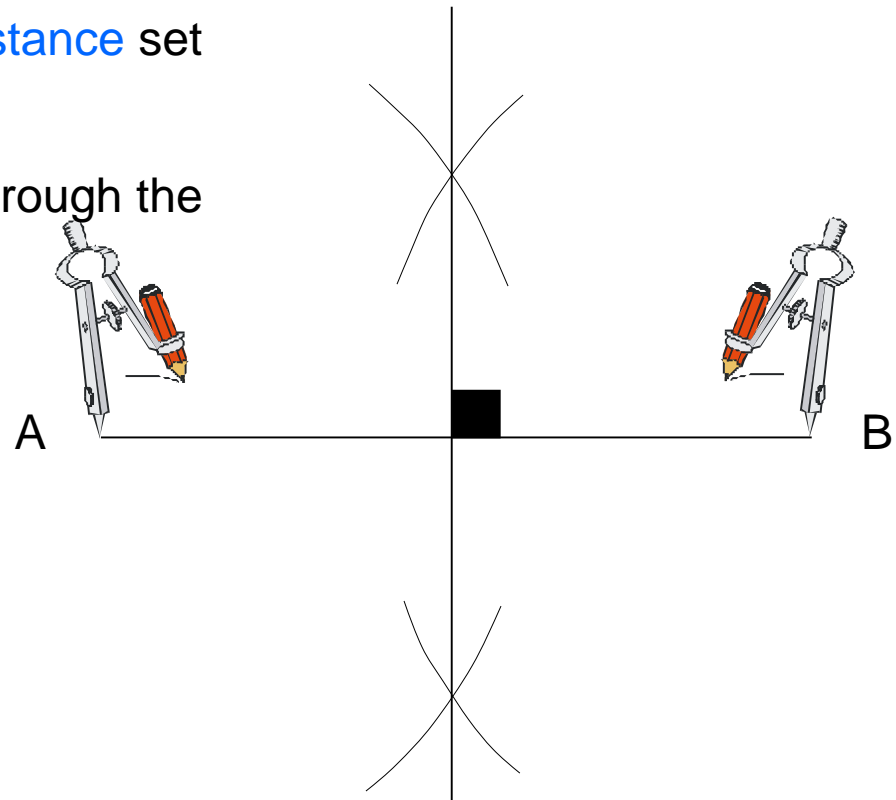
Compass and
"Straight Edge"
Constructions with
some proofs.

Constructions

To Construct the **Perpendicular Bisector** of a line.

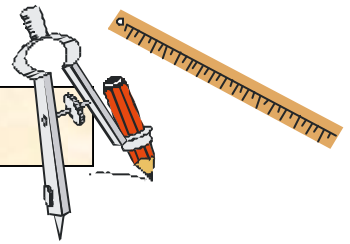


1. Place compass at A, set over halfway and draw 2 arcs.
2. Place compass at B, **with same distance** set and draw 2 arcs to intersect first two.
3. Draw the perpendicular bisector through the points of intersection.

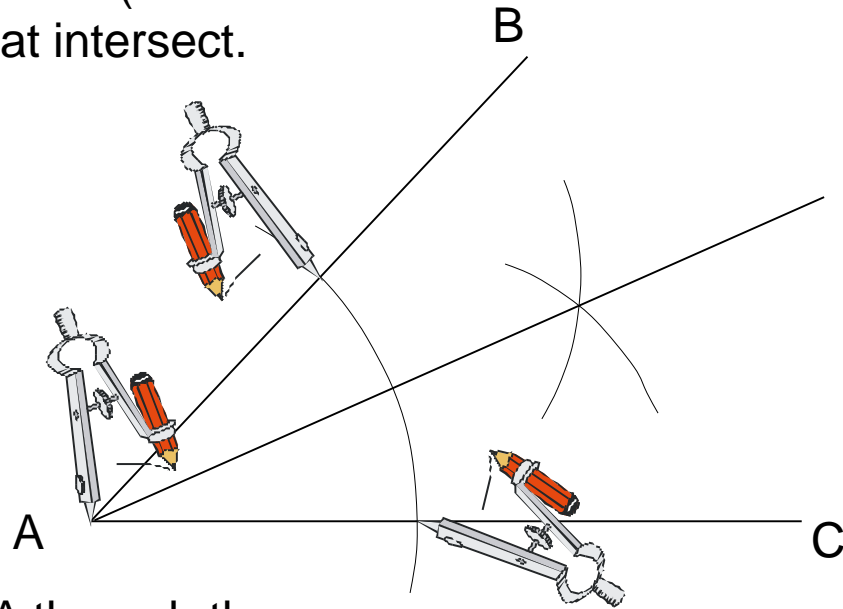


Constructions

To Construct the **Angle Bisector** of a given angle.



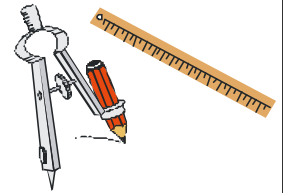
1. Place compass at A, and draw an arc crossing AB and AC.
2. Place compass at intersections and (with the same distance set) draw 2 arcs that intersect.



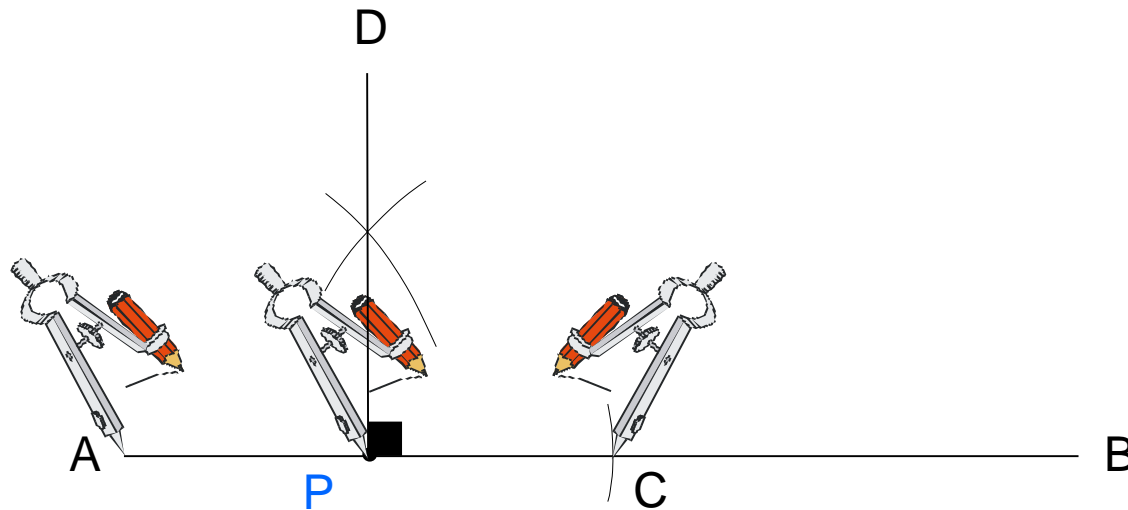
3. Draw the angle bisector from A through the point of intersection.

Constructions

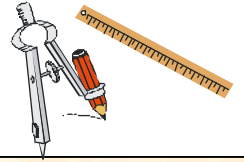
To draw a perpendicular to a given point on a line.



1. Place compass at **P** and with distance PA set, draw arc at **C**.
2. With compass at **A** and distance set greater than AP , draw arc above line **AB**.
3. Repeat with compass at **C** and same distance set.
4. Draw line through intersection of arcs to **P**. This line is perpendicular to **P**.

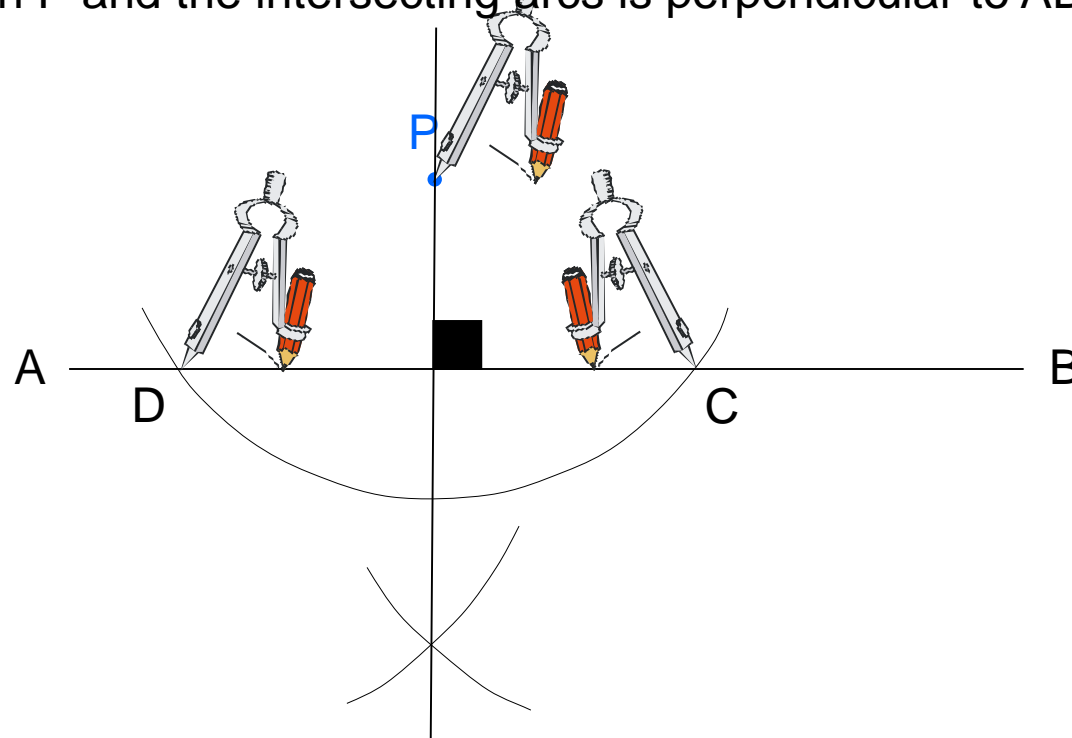


Constructions



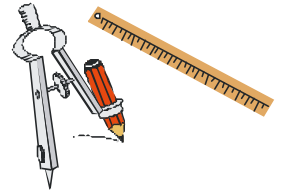
To construct the perpendicular to a given line from a given point, not on the line.

1. With centre **P**, draw an arc of a circle that intersects AB at 2 points.
2. With centre C and compass set over $\frac{1}{2}$ distance CD draw arc below AB.
3. With centre D and **same distance set**, draw an arc to intersect the previous one.
4. The line through P and the intersecting arcs is perpendicular to AB.



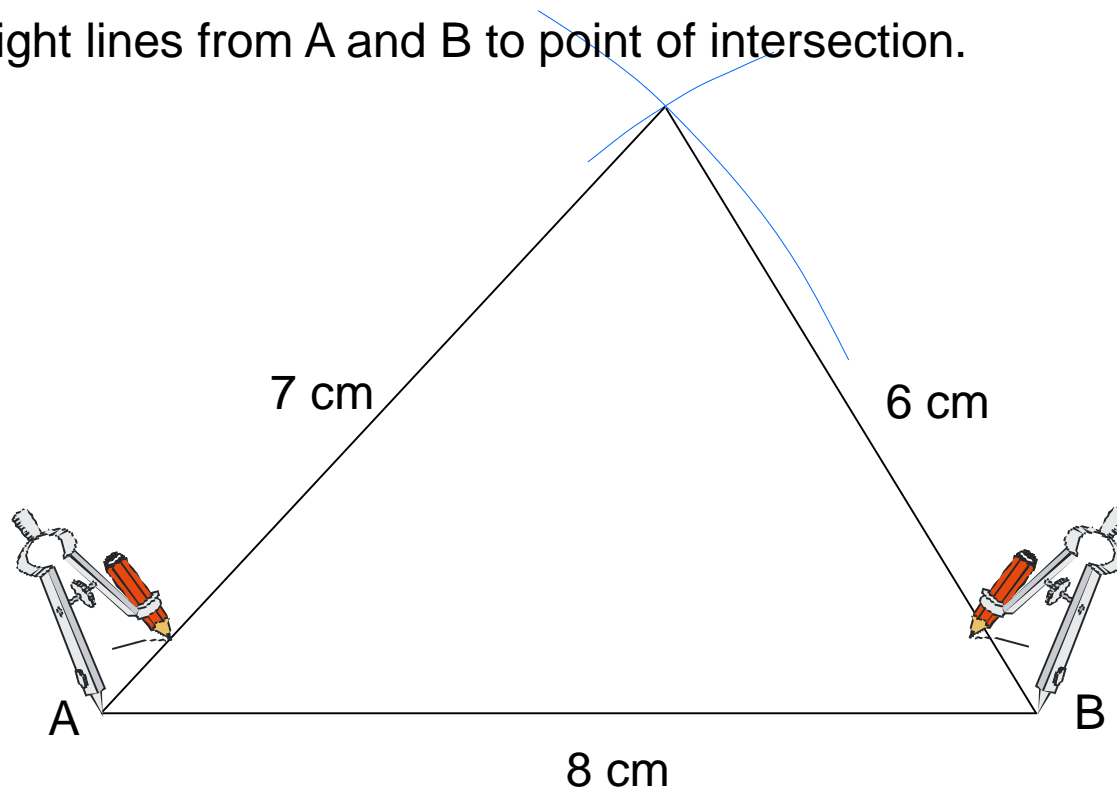
Constructions

To Construct a triangle, given 3 sides.



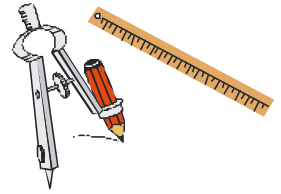
Example 1: To construct a triangle of sides 8 cm, 7cm and 6 cm.

1. Draw line 8cm long and use as base of triangle.
2. Set compass to 7 cm, place at A and draw an arc.
3. Set compass to 6 cm, place at B and draw an arc to intersect the first one.
4. Draw straight lines from A and B to point of intersection.



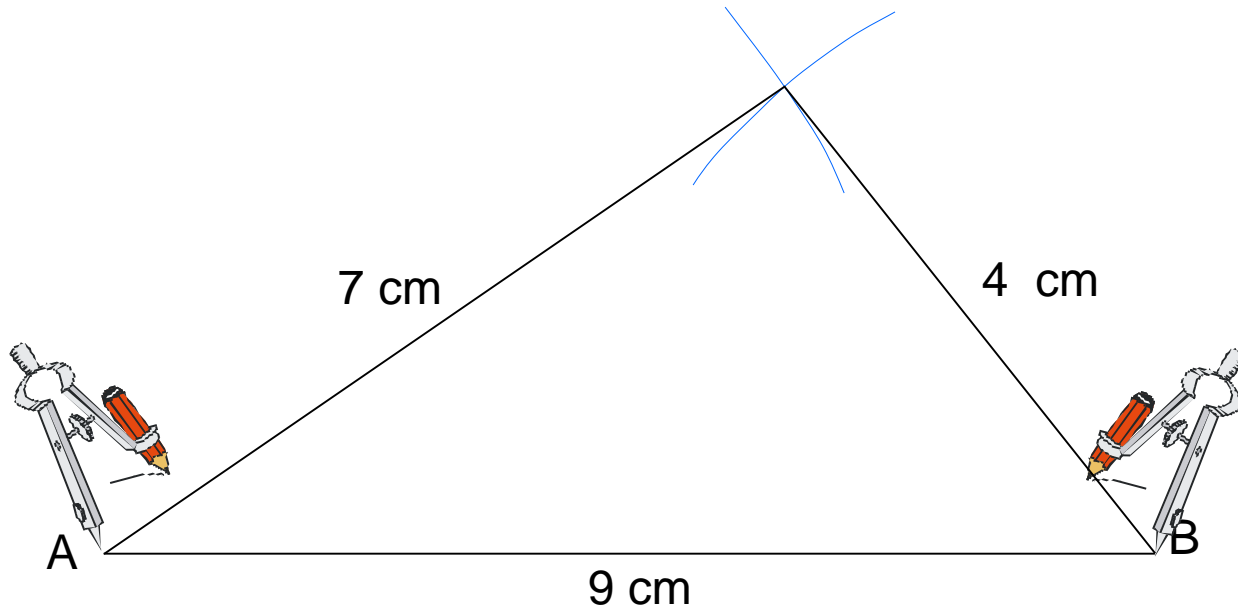
Constructions

To Construct a triangle, given 3 sides.



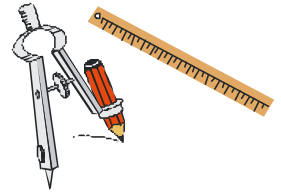
Example 2: To construct a triangle of sides 7 cm, 9 cm and 4 cm.

1. Using the **longest** side as the base, draw a straight line 9 cm long.
2. Set compass to 7 cm, place at A and draw an arc.
3. Set compass to 4 cm, place at B and draw an arc to intersect the first one.
4. Draw straight lines from A and B to point of intersection.



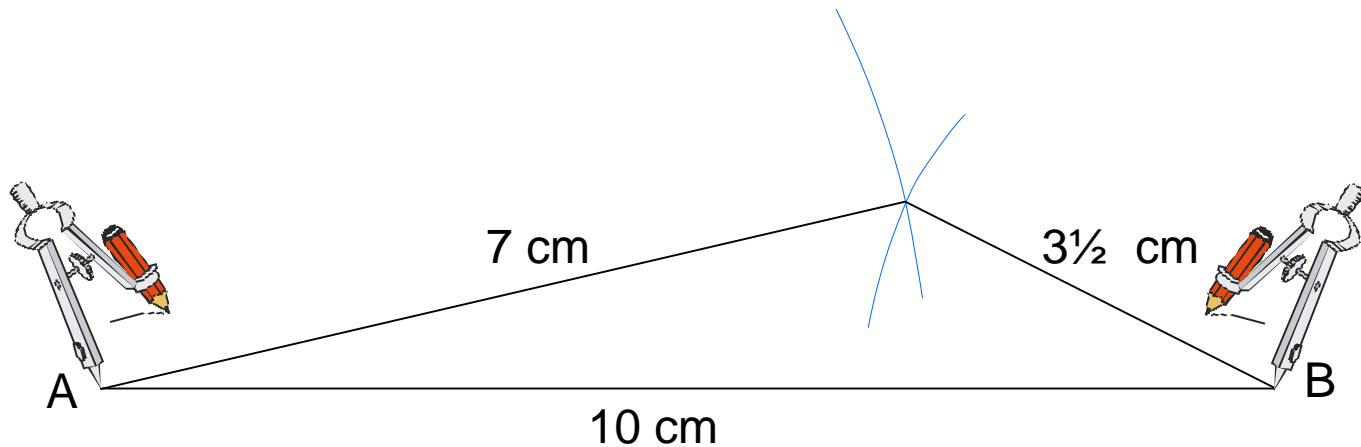
Constructions

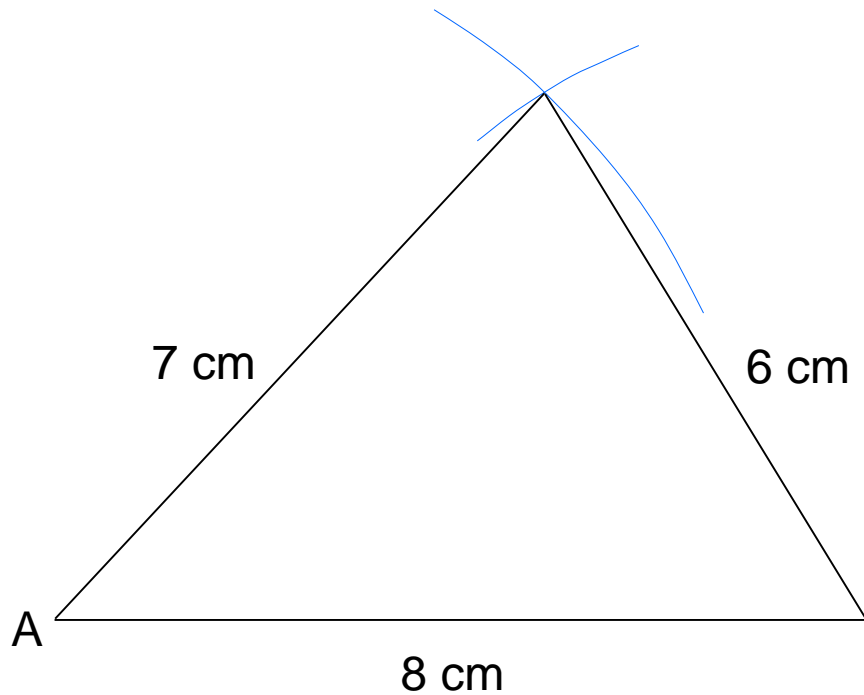
To Construct a triangle, given 3 sides.



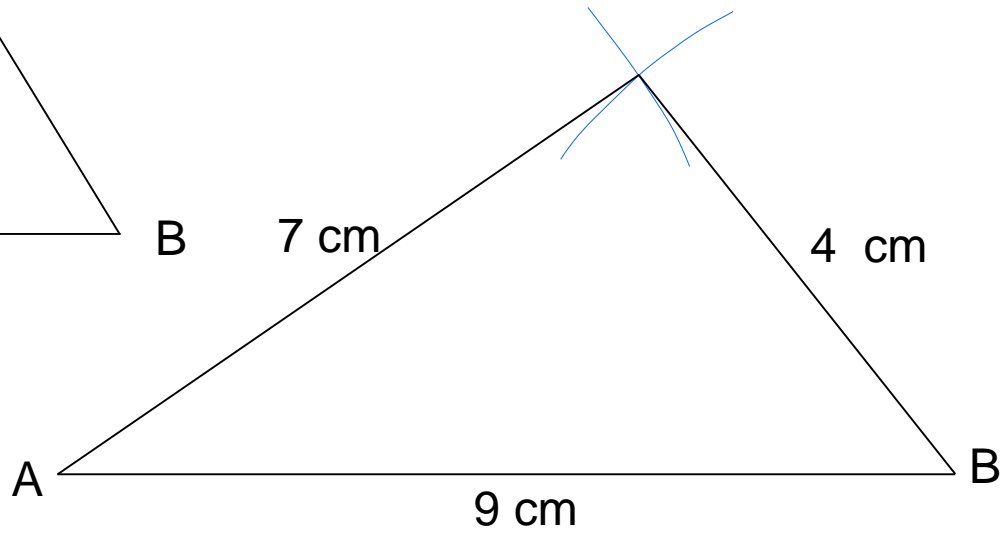
Example 3: To construct a triangle of sides 7 cm, $3\frac{1}{2}$ cm and 10 cm.

1. Using the longest side as the base, draw a straight line 10 cm long.
2. Set compass to 7 cm, place at A and draw an arc.
3. Set compass to $3\frac{1}{2}$ cm, place at B and draw an arc to intersect the first one.
4. Draw straight lines from A and B to point of intersection.

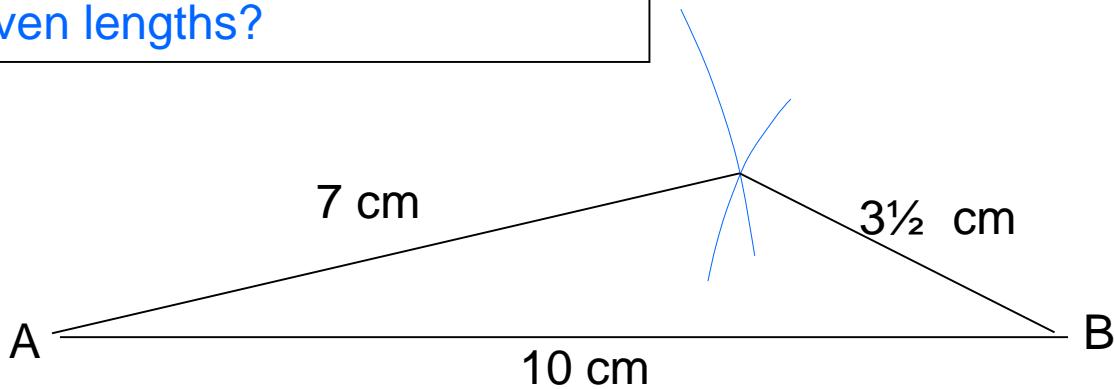




Explain why a triangle with sides 2 cm, 10 cm and 7 cm cannot be constructed.



Under what conditions can it be guaranteed that a triangle can be constructed from 3 given lengths?



The sum of the lengths of the smaller sides must exceed the length of the longest side.

The table below shows lengths of sides for constructing a triangle. Which ones **cannot** form a triangle?

	Side 1	Side 2	Side 3
1	12 cm	8 cm	7 cm
2	9 cm	12 cm	4 cm
3	8 cm	15 cm	7 cm
4	18 cm	3 cm	20 cm
5	8 cm	8 cm	17 cm
6	19 cm	7 cm	13 cm
7	9.3 cm	18 cm	7.2 cm
8	50 cm	26 cm	23 cm
9	40 cm	41 cm	82 cm
10	99 cm	2 cm	100 cm