

### Example 1: watergutter

#### Geometrical solution – long version



Open a graphs window and move the x-axis to the bottom.

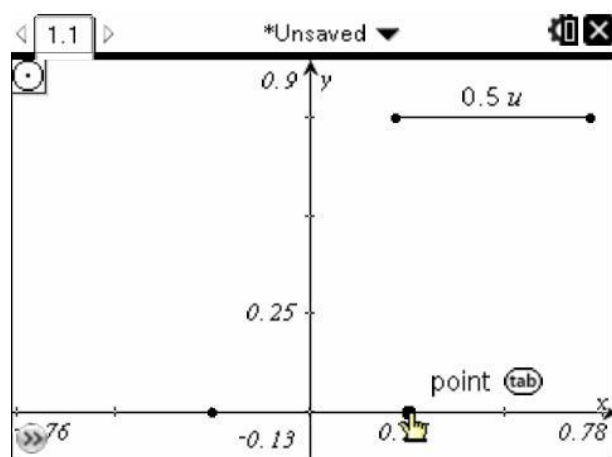
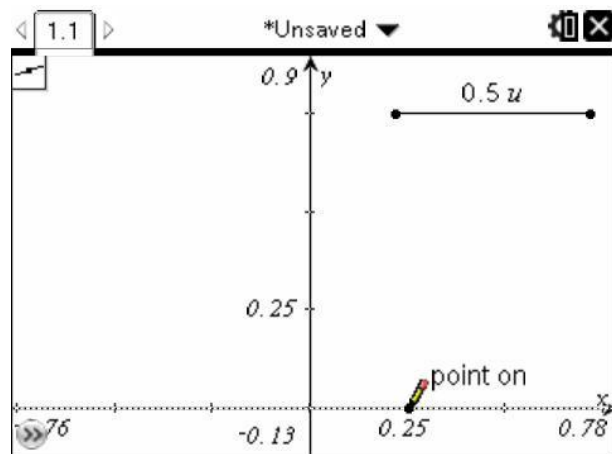
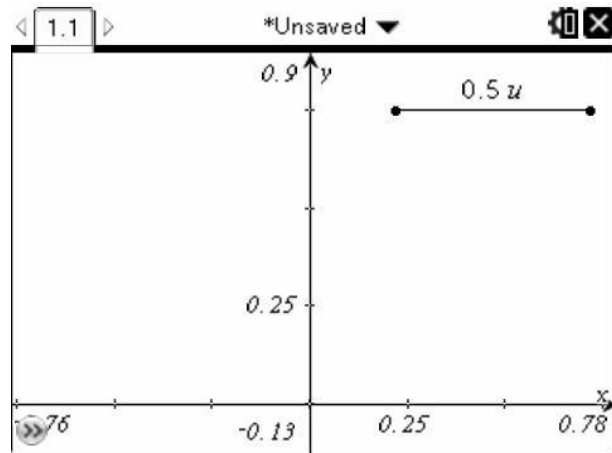
Choose window settings as in the picture.

Draw a line (top right) and measure its length.

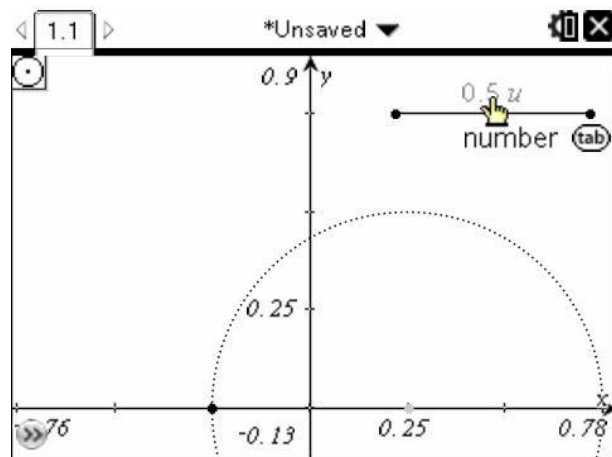
Click on the length twice, so that you can edit the length; adjust it to 0.5 units.

Place two points on the x-axis, each 0.25 units from the origin, so that you have a base line of 0.5 units.

Draw two circles that have their midpoints on the marked points and have radius 0.5 units.

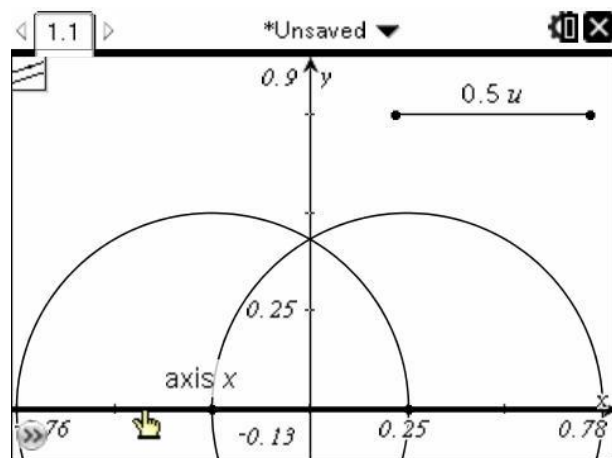


The radius of the circles can be chosen as 0.5 units by clicking for the radius on the length of the line top right.



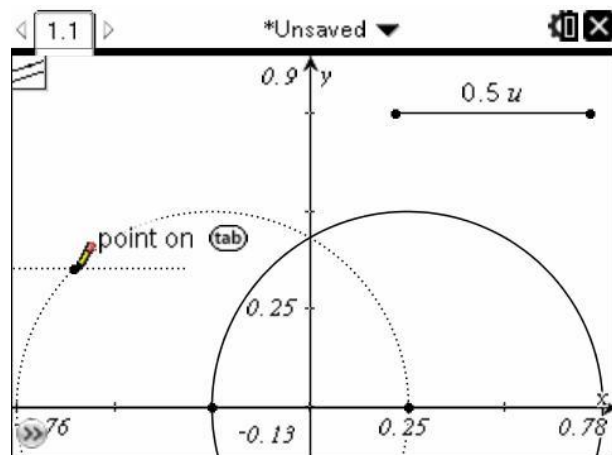
The picture shows the two circles.

Next draw a parallel to the x-axis which is already marked in the screenshot.

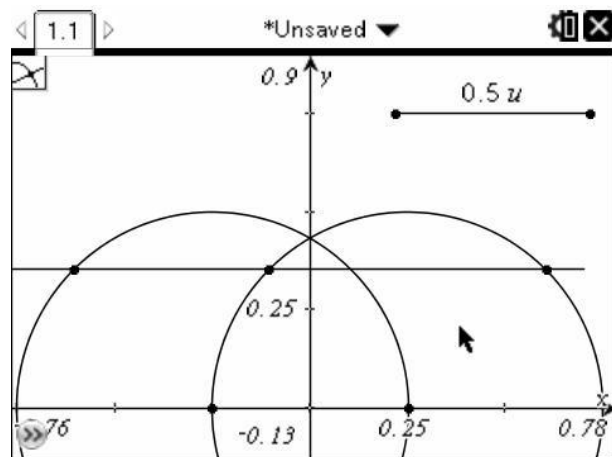


Next a point on one of the circles – here the left one - is chosen where the parallel is drawn.

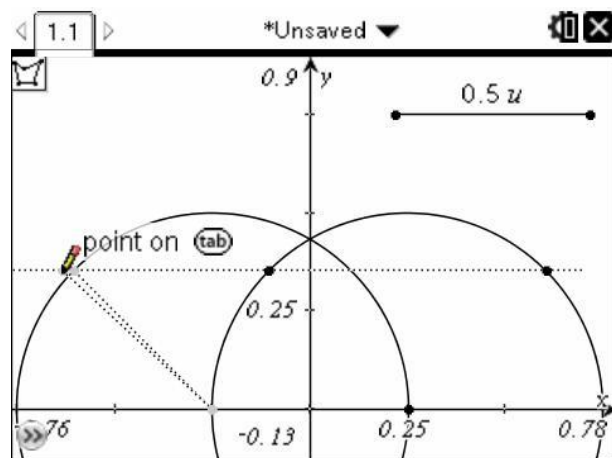
This point can later be moved to change the shape and area of the cross section that will now be constructed.



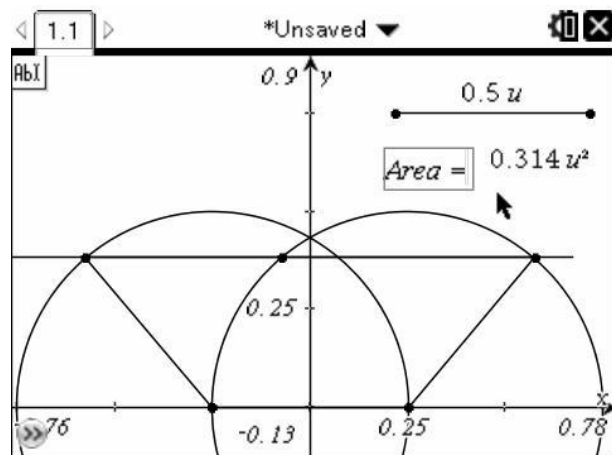
Find the intersection points of the parallel and the two circles.



To define the cross section draw a polygon joining the adequate points.

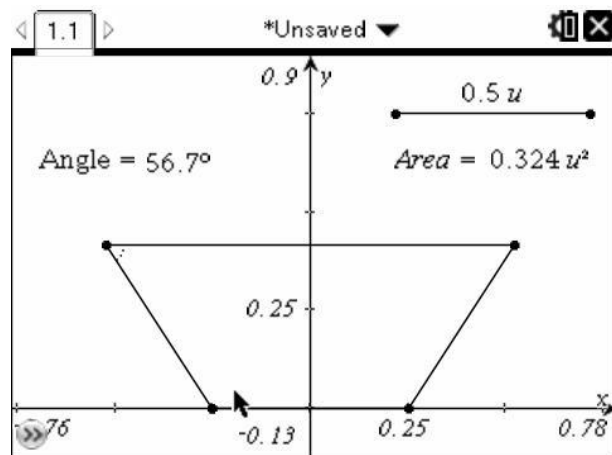


Measure the area of the polygon, add a corresponding text to the measured value.



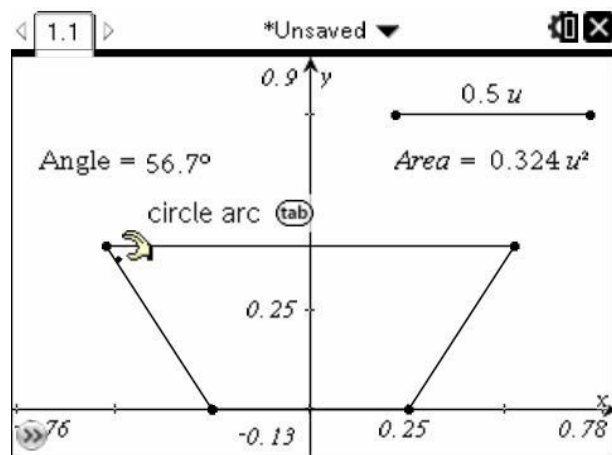
To see the essential it is recommended to hide the objects only necessary for the construction, e.g. the circles.

Measure the angle top left of the polygon, add a corresponding text to the measured value.

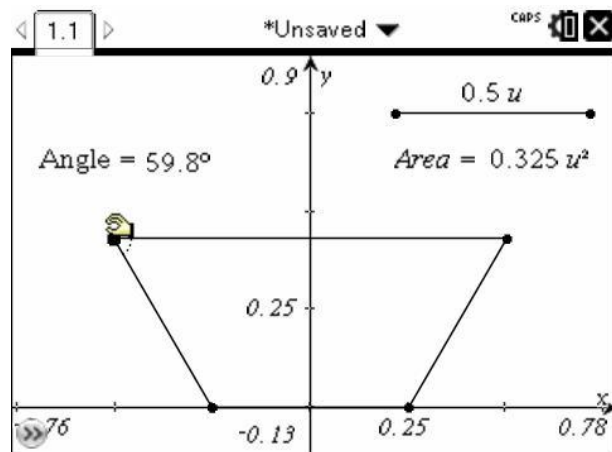


Now you can seize the point top left and move it to change the form and area of the trapezoid.

Thus you can move the point to a position with the trapezoid's maximal area



You finish the geometrical solution with an approximate solution of  $60^\circ$  for the angle top left of the trapezoid.



### Maximum of the function with a function plotter

The maximum of the given function directly leads to the solution.

