

Example 1: watergutter

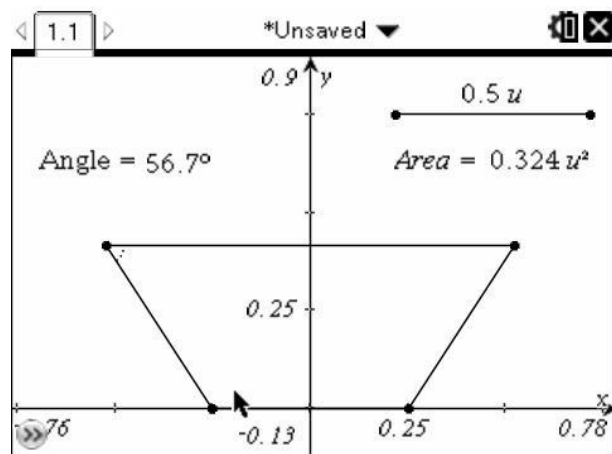
Geometrical solution – short version

The following solution focuses on the idea that the water gutter can be constructed geometrically and the measurement of the resulting area can be taken.

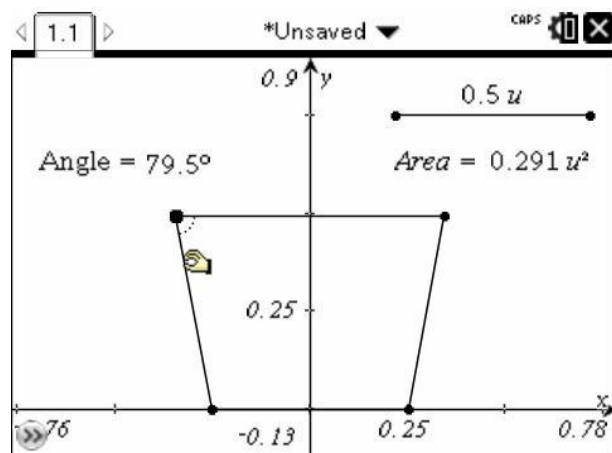
Follow the construction (details see long version):

The cross section of the water gutter of the fence is drawn as shown below. Therefore the base line is fixed as a line of 0.5 units length (top right). Next two circles with midpoint 0.5 resp. -0.5 on the x-axis and radius 0.5 are drawn. A parallel through a point on one of the circles is drawn. The intersection points of the parallel and the two circles are marked. These points together with the circles' midpoints define the vertices of a trapezoid. This trapezoid is the cross section of the water gutter. The vertex that was set on one of the circles can be moved; so the cross section can dynamically be changed.

It is our objective to analyse the area dependent on the left upper angle of the trapezoid.



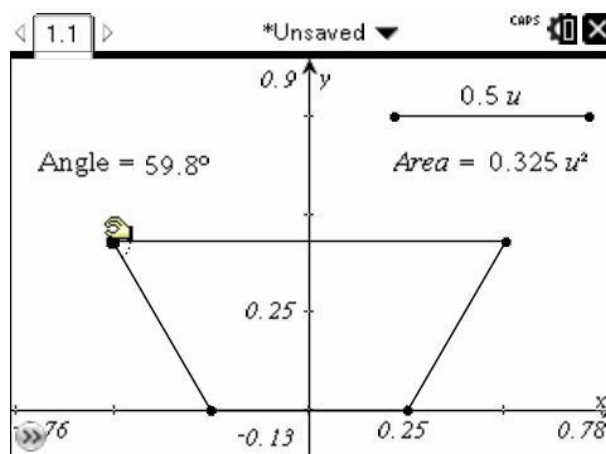
Here several views are shown.









By moving the point on the left circle the maximal area can (approximately) be adjusted.

The optimal value is approximately 60° .

The maximal area is about 0.325 square units.



You want....	Application	How to do it with TI-Nspire™
To draw a line	Graphs & Geometry	[menu], 7: Points & Lines, 5: Segment]
To draw a point on a line	Graphs & Geometry	[menu], 7: Points & Lines, 2: Point on] Point on object
To draw a parallel line	Graphs & Geometry	[menu], A: Constructions, 1:Parallel]
To draw a polygon	Graphs & Geometry	[menu], 9: Shapes, 4: Polygon]
To measure length and area	Graphs & Geometry	[menu], 8: Measurement, ...] then click on 1:Length and 2:Area  Measurement
To construct the intersection point	Graphs & Geometry	[menu], 7: Points & Lines, 3: Intersection Point(s)], click on intersecting objects   Point , Intersection Points
To draw a circle with given radius	Graphs & Geometry	[menu], 9: Shapes, 1: Circle] click on midpoint and then on a text with a number for the radius
To move a point	Graphs & Geometry	[menu], 1: Pointer], go to point with pointer and press a for one second

To cancel last step	Graphs & Geometry	 
To measure an angle	Graphs & Geometry	<p>[, 8: Measurement, 4:Angle], click first on one leg, then on the vertex, then on the other leg.</p> <p>Use existing points on the legs.</p>