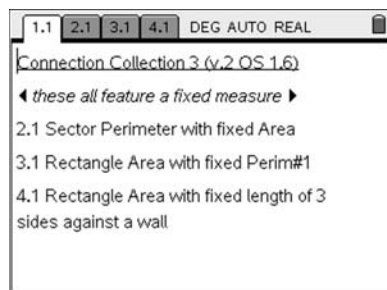


“Connections Collection 3”

General



This file is a further collection of 3 new ‘Connections’ activities, that all feature a fixed measure (be it area, total perimeter or partial perimeter)

- 2.1 Sector Perimeter with fixed Area
- 3.1 Rectangle Area with fixed Perimeter
- 4.1 Rectangle Area with fixed length of 3 sides against a wall

In each, the student is required to establish both graphically and algebraically the function connecting the input parameter to the output parameter.

These constructions are slightly more complex/less obvious than those contained in both Connections Collection 1 and 2.

Student Specific

Use the generic ‘Thought-Sheet’ (page 2) to guide you through how to consider the dynamics of this situation, and what sort of relationship it reveals. This task is best done by thinking about it first and then doing it second, in order to see how well formed your thoughts were.

Teacher Specific

In contrast to the other Connections files, each of these is contained on a single page in a single problem, rather than capturing data in spreadsheets and plotting them in a Data & Statistics Application (although this can still be done, if desired, within each problem).

The **graph.on** slider switch enables a view of the data plot, or not, as the diagram is manipulated. (1 means on and 0 means off)

The user can also **use the locus command** to reveal the shape of the graph of the function without knowing its algebraic expression. To do this, switch the graph on (set graph.on = 1) then select Locus (Menu > Constructions > Locus), then click on the plotted point on the graph area, then move over - but don't click on - the point on the geometrical construction that you normally grab and move. This procedure reveals the function curve, without plotting it. Pressing ESC reverts back out of Locus mode.

TI Nspire OS1.6 is required to use these files, due to slider configurations.

Challenge your students to complete as many of these pages as they can in a certain time – and they may choose to do whichever ones they wish in any order!

Feedback

Do you have any comments on these notes?

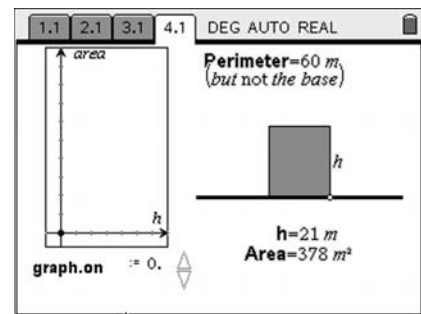
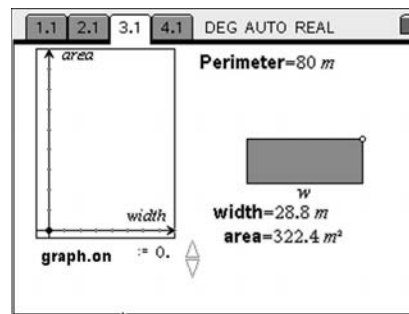
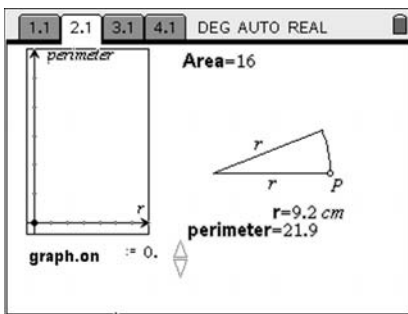
Please get in Contact via the website and help improve them further.

All contributors are acknowledged.

Name: _____

Date: _____

Connections – HG077 – Thought Sheet



Note: for page 2.1, if you reduce the radius too much, it forces the segment to have a reflex angle at its centre, and the geometrical construction 'breaks down'. Hence the construction is only valid for acute and obtuse angles at the centre.

For the constructions illustrated above, jot down your answers to the following key questions:

1. Is the data relationship linear, or non-linear?
 - a) If it's linear, what is the slope of the line?
 - b) If it's non-linear, is the curve upwards or downwards?
2. Is there a direct, or indirect variation?
3. Is the data relationship symmetrical in any way?
4. Is there a maximum, or a minimum?
5. Are there places where it cuts the x-axis (called 'zeros') and, if so, what do they represent?
6. Does it cut the y-axis and, if so, what does that point represent?
7. Can you now draw the shape of the curve?
Sketch on it the axes on one of the screenshots at the top of this sheet.
8. Can you now construct this interactive geometry file, or use the one provided to you, to check all of your thoughts so far?
9. Can you use algebra to work out the equation of the curve?

Using the TI-Nspire, you can check how good your answer to question 9 is by plotting your resultant function each set of axes.