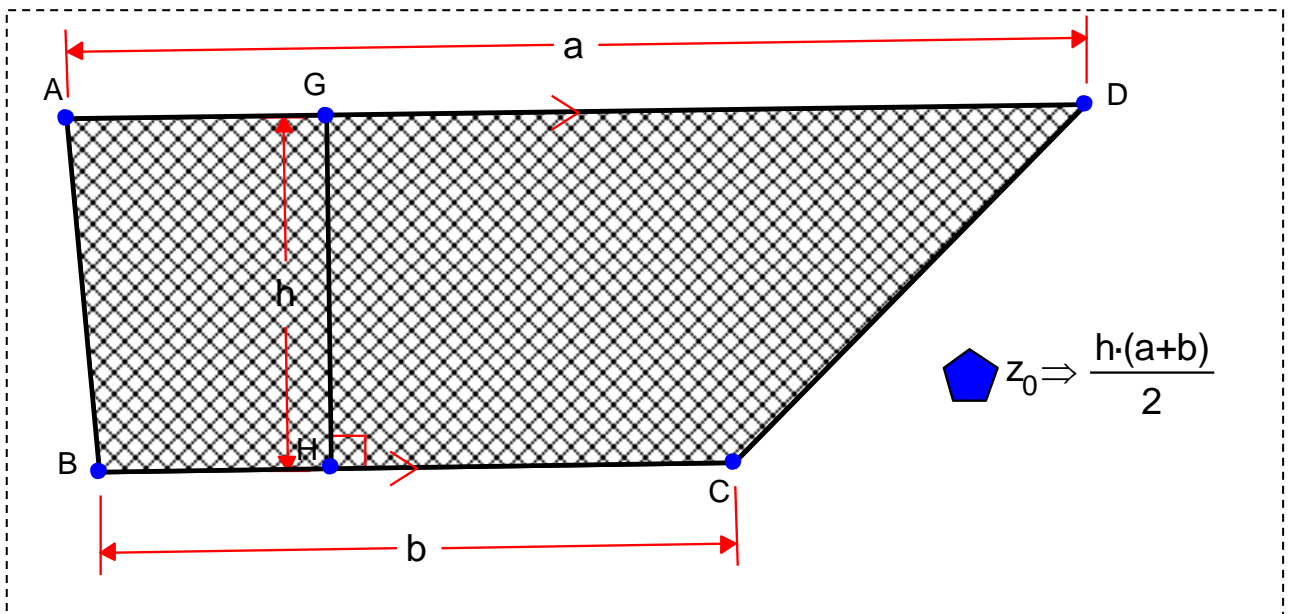


MANSW CONFERENCE 2008

Geometry Expressions



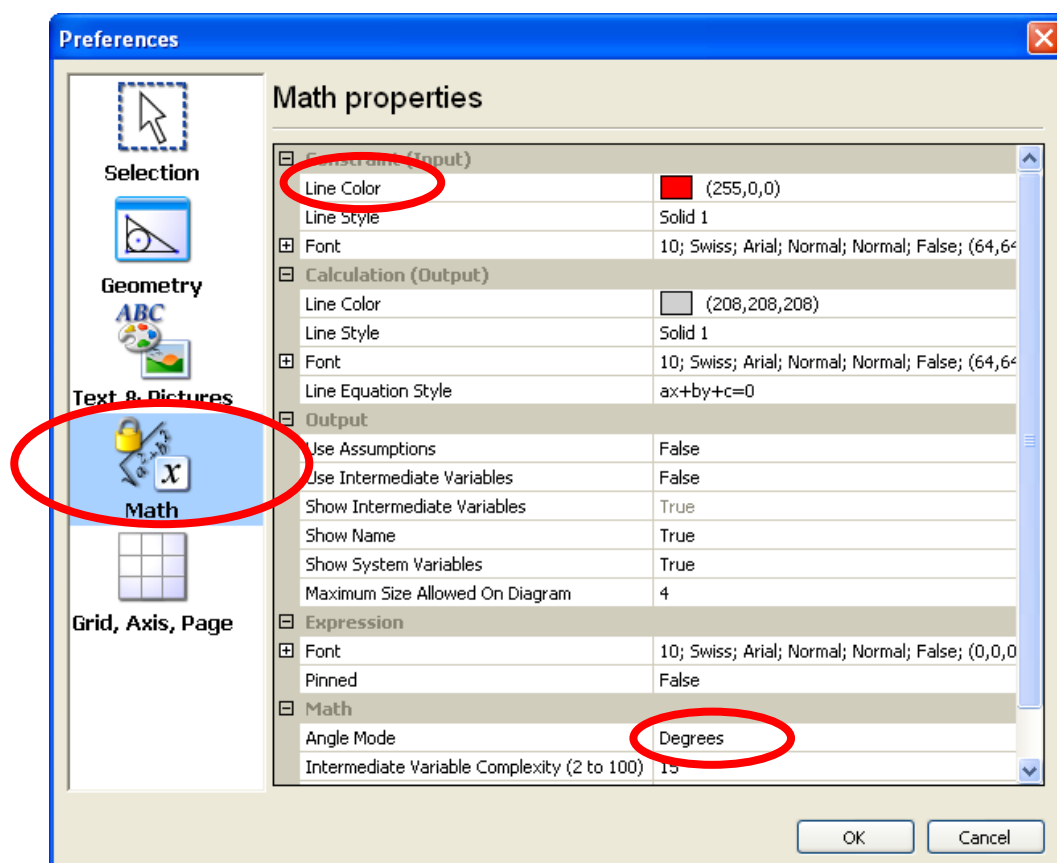
Tobias Cooper

croob@optusnet.com.au


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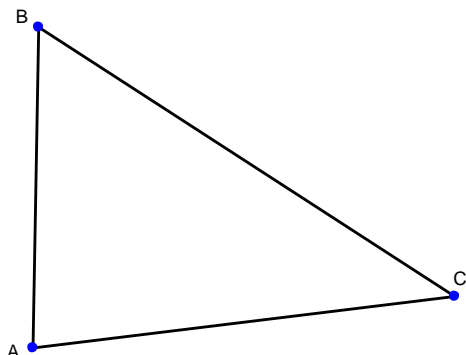
Getting Started:




1. Click on the **Edit** menu and choose **Preferences**.
2. Click on **Math** in the side bar
3. Change the **Angle Mode** to degrees.
4. In the **Constraint(Input)** section, change the line colour to **red**.
5. Click O.K.

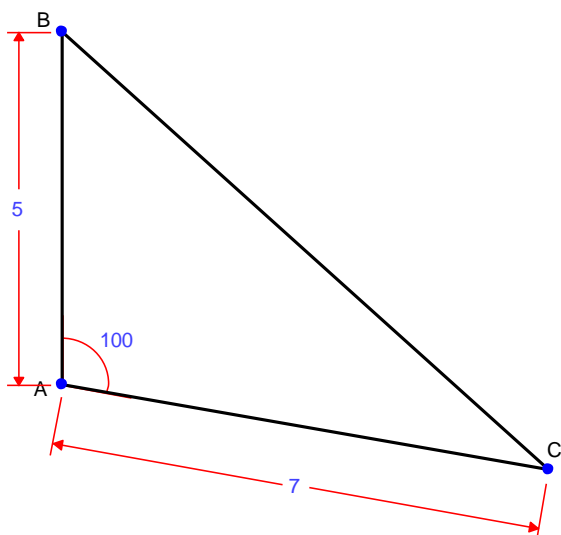


Activity 1: Creating diagrams with constraints

1. Click on the **line segment** button .
2. Draw a triangle.

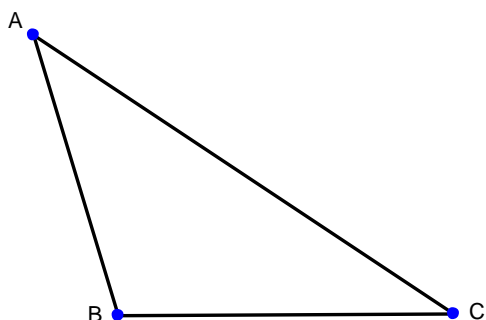




3. Click back on the arrow select tool  and drag each vertex to see if it stays intact.
4. Click on AB to select it.
5. Click on the **Distance/Length** constraint button  in the **Constrain(Input)** palette.
6. Type **5** on the keyboard and press Enter on the keyboard.
7. Click on AC to select it.
8. Use the **Distance/Length** button to make AC 7 units long.
9. Hold the SHIFT key down and click on AB and AC to select both sides together.
10. Click on the **angle constraint button**  in the **Constrain(Input)** palette.
11. Type 100 and press **Enter** on your keyboard.
12. Go to the Edit menu and choose **Copy Drawing**.
13. Open Microsoft Word and paste the picture in to the document.
14. Use the **crop tool** on the **picture toolbar** to crop the image.

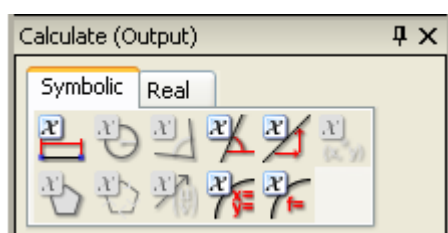



Activity 2: Measuring exactly

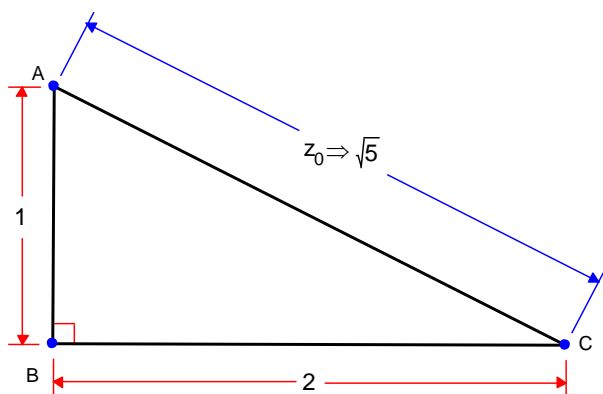
1. Click on the File menu and choose **New** to create a new blank page.
2. Draw a triangle.



3. Hold down the SHIFT key and click on AB and AC.
4. Click on the **perpendicular button**  in the **Constrain(Input)** palette.
5. Use the **Distance/Length** constraint button  in the **Constrain(Input)** palette to make $AB = 1$ unit and $BC = 2$ units.
6. Click on AC to select it.
7. Click on the **Symbolic** tab in the **Calculate(Output)** palette.

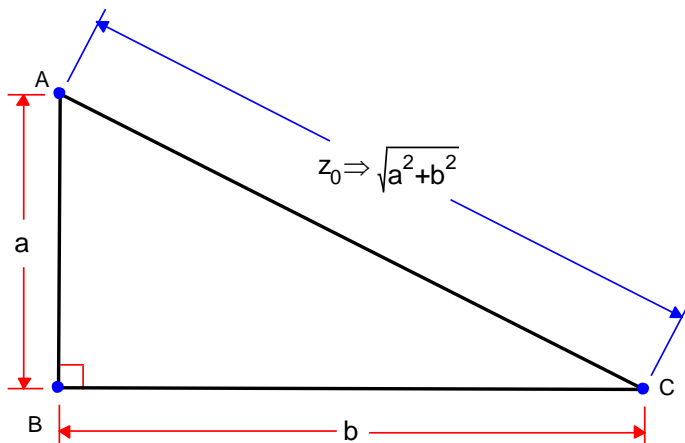


8. In this palette click on the **distance/length** button .



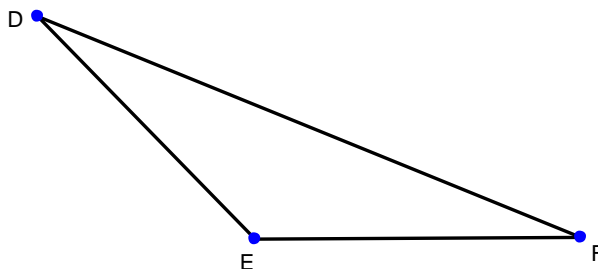
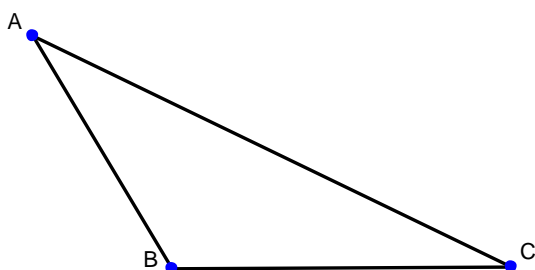
Activity 3: Measuring symbolically


1. Double click the 1 on AB and enter 'a' from the keyboard. Press **enter** on the keyboard.
 2. Double click the 2 on AB and enter 'b' from the keyboard. Press **enter** on the keyboard.
- The hypotenuse should have its length defined **symbolically**.



Activity 4: Developing Congruence tests for triangles.

1. Click on the File menu and choose **New** to create a new blank page.
2. Draw two obtuse angled triangles.

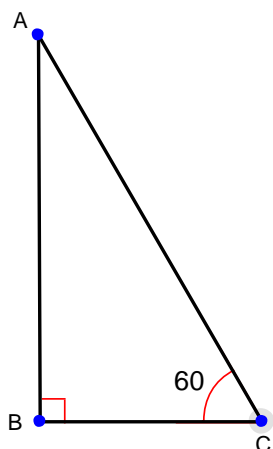


3. Use the **Distance/Length** constraint button  in the **Constrain(Input)** palette to constrain AB to 5 units in length.
4. Constrain the corresponding side DE to 5 units of length.
5. Similarly, constrain BC and EF to 7 units of length.
6. Drag the vertices of each triangle to show students the triangles are **not** congruent.
Ask them what also needs to be constrained to make the triangles congruent.
7. Constrain $\angle ABC$ to 100° and $\angle DEF$ to 100° .
8. Grab the second triangle and drag it onto the first triangle to show they are congruent.


9. Try developing the AAS and RHS tests in a new blank page.

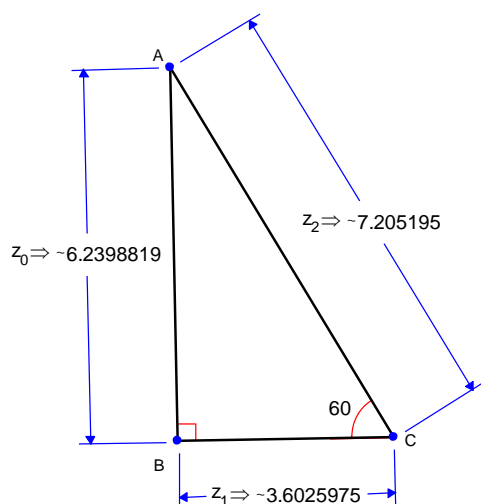
Activity 5: Real Measurements and calculations


1. Click on the File menu and choose **New** to create a new blank page.
2. Use the **Constrain(Output)** palette to create a right angled triangle with one 60 degree angle.



3. Click on AB and click on the **Real** tab in the **Calculate(Output)** box.

4. In this palette, click on the **distance/length** button  to measure the length as a decimal.
5. Measure BC and AC in the same way.



6. Go to the **Draw** palette at the top right of screen and click on the **expression** button .

7. Click once on the screen.

8. Click on the fraction button  in the **Symbols palette** at the bottom right of the screen.

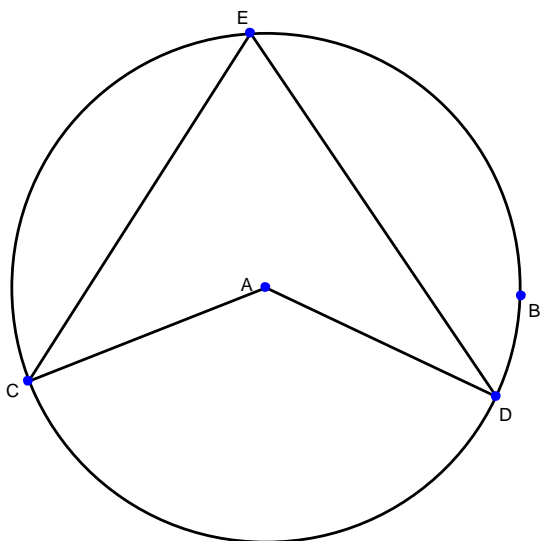
9. Use the subscript button  to enter $\frac{z_1}{z_2}$ and click on the selection arrow to finish the calculation.

10. Drag a vertex to see the ratio remain unchanged.

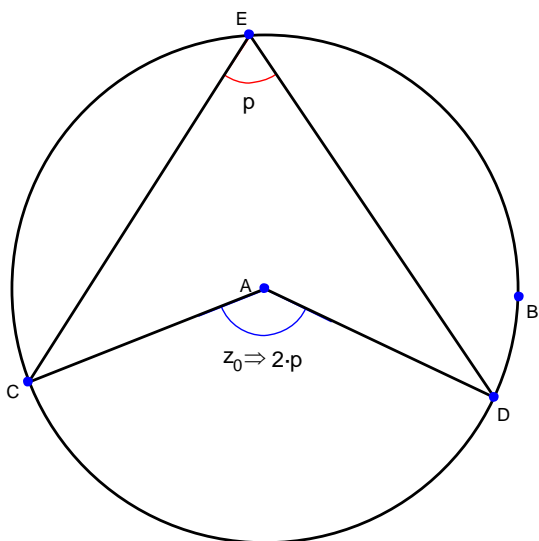
11. Try this activity again and constrain BC as 'a' when you first start to measure the sides.

Activity 6: Circle Geometry

1. Click on the File menu and choose **New** to create a new blank page.
2. Use the circle and segment tools to draw the following diagram.






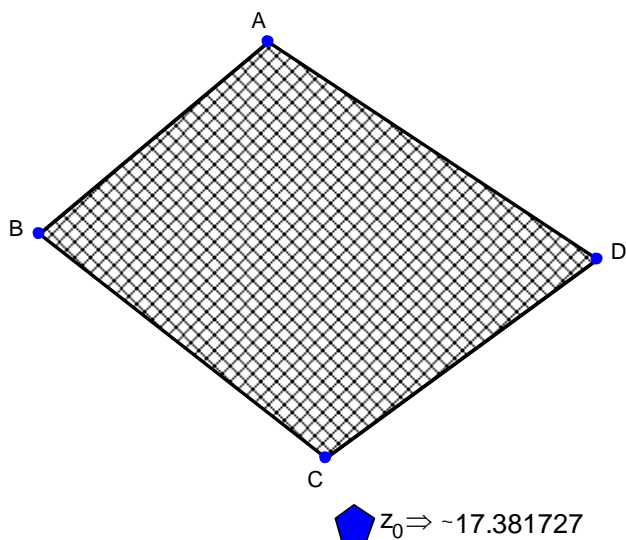
3. Constrain angle CED to be '**p**'.
4. **Measure angle CAD** symbolically using the **Symbolic tab** from the **Calculate(Output)** palette.



5. Drag the vertices on the circle.

Activity 7: Area

1. Click on the File menu and choose **New** to create a new blank page.
2. Click on the polygon button  and draw a quadrilateral.
3. Click on the select arrow button  and click on the interior of the quadrilateral.
4. Click on the real tab in the **Calculate(Output)** palette and choose **Area** .



Activity 8: Other ideas

- Locus of a parabola.
- Properties of quadrilaterals.(Y7)
- Measuring the symbolic area of a trapezium.

