**PreCalculus 10**

**Trigonometry Project – Flags**

National flags come in all sorts of different designs. Some are plain and some are elaborate. Some are multi-coloured and some are a single hue. Some contain circles, some rectangles, and some even contain wonderful TRIANGLES!!!

Your assignment is to design a flag for the new nation of Mathlandia (Mr. Wadge is the Supreme Leader and Spiritual Advisor). You will turn in the plan for your flag to Mr. Wadge and a small committee of experts (also known as Mr. Wadge’s grade 8 students) will vote on the best one. The winning flag will be hung at the front of Room 311 for the remainder of the year (and its designer will receive a few Bonus marks).

Of course, the winning flag design is sure to become very popular. Many people will want to make their own Flag of Mathlandia and fly it from their rooftops, car antennae, earlobes, etc. In order to make sure that they make the flag correctly, you are going to have to provide them with all the necessary dimensions / measurements.

Here’s what you need to do:

1. Create the design for your flag on a piece of white paper
2. Your flag must contain (at least) four triangles – 3 right triangles (non-congruent) and 1 acute (non-right) isosceles triangle. The triangles might overlap or reside inside one another.
3. Your flag may contain other symbols and / or shapes
4. Your flag must be coloured
5. On a second piece of paper, copy / trace your flag but do NOT colour this one (this is the flag where you will do your measurements / calculations)
6. On the first right triangle measure / label (with a ruler and protractor) the right angle, one other angle, and the hypotenuse. Label all these with a red pen.
7. On the second right triangle measure / label (with a ruler and protractor) the right angle, one other angle, and one of the legs. Label all these with a red pen.
8. On the third right triangle measure / label (with a ruler and protractor) all three sides. Label all these with a red pen.
9. On the isosceles triangle measure / label (with a ruler and protractor) the two congruent sides and the angle between them. Label all these with a red pen.
10. Now it’s time to calculate (not measure!) the remaining angles and sides. Make sure you show ALL your work (either on the non-coloured flag or on a third piece of paper) and record the final values on the non-coloured flag (use any colour other than red). Do all this very neatly!
11. Write a short explanation of why your flag should be chosen as the winner. You may wish to include a description of why you chose the design you did.

**Less creative option: find an image of a pre-existing flag & follow steps 2 – 10 above**