

Problem Set 1

Please complete and submit **any ONE** of the following problems. The deadline for submission is January 7 by 11:59 PM. Send your submission by email to benjamin.fedoruk@ontariotechu.ca with the header “[Surname] Problem 1”.

1. Construct a 15-degree angle, showing all steps. Explain why you are certain it is 15 degrees.
2. Given a circle with centre O passing through point A on its circumference, construct two more points B and C on the circle such that the arc AB equals the arc BC equals the arc AC. Show all steps.
3. Construct a perfect square. Show all steps.
4. Construct the incircle and outcircle of an equilateral triangle. That is, draw the largest possible circle which fits fully within the triangle and draw the smallest possible circle which fully contains the triangle. Show all steps.
5. Show that the number the golden ratio is constructible, where the golden ratio is $\phi = \frac{1+\sqrt{5}}{2}$. Show all steps.