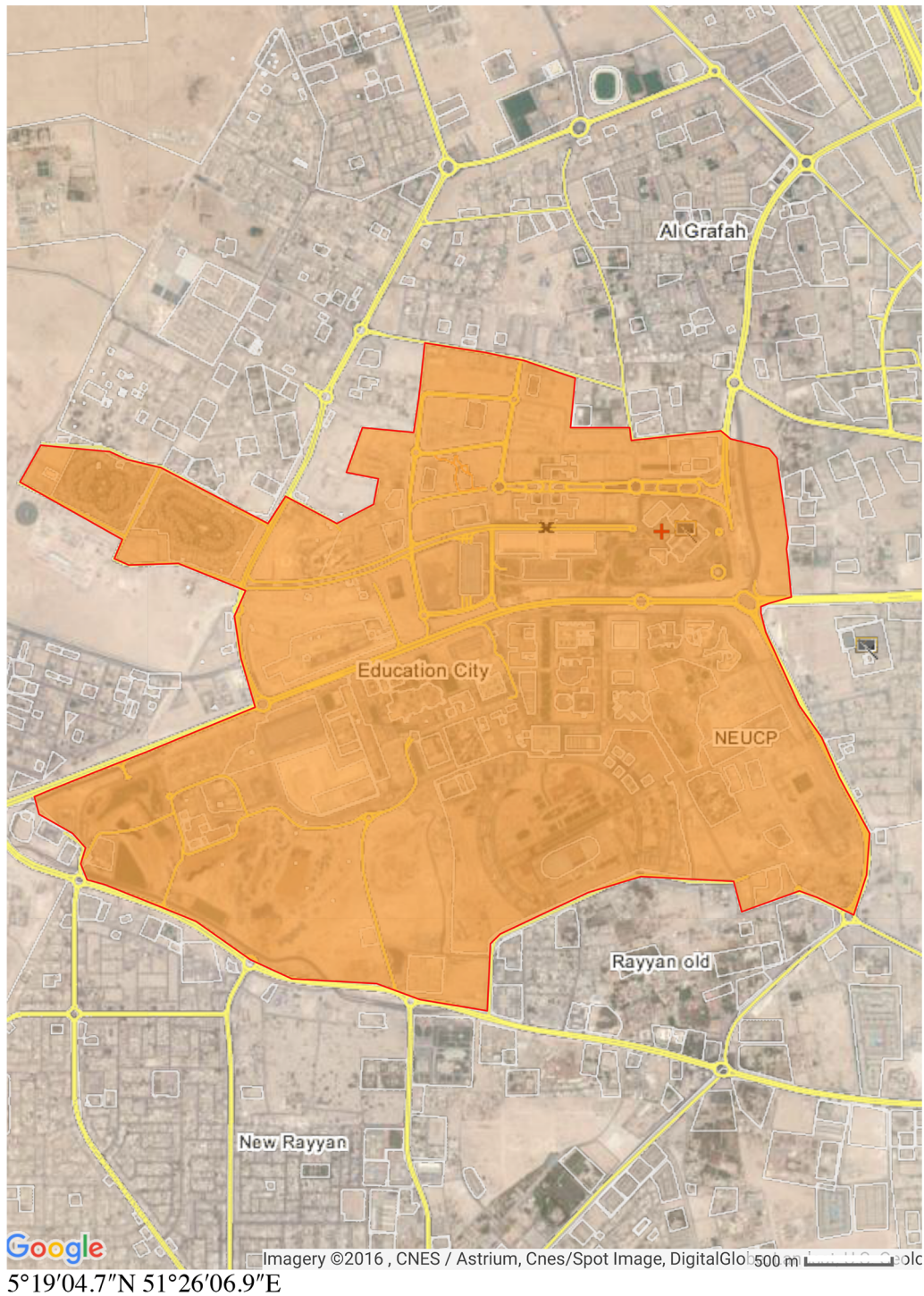**48-175 Descriptive Geometry Assignment 1**

Due Date February 2, 2016

Write your name *on each sheet of your assignment answers*
Draw your constructions as *neatly* *as possible, and definitely, as* *accurately* *as possible.*

1. The map below shows an outline of Education City, Doha.

5°19′04.7″N 51°26′06.9″E

Trace the outline of Education City as a suitable polygon and construct a *line* whose length represents the *area of the place*. Assume for this problem that the terrain is flat. Use the scale given on the map in drawing the map and for determining the area. A separate image file is attached.

[NOTE: You do not need to be accurate. I am more interested in whether you understand the process. However, the polygon you begin with should have no fewer than 10 vertices. Obviously your result will be more accurate with a greater number of sides. Use multiple colors or pages to ensure legibility.]

2. Construct *accurately* on a separate sheet a staircase with the following profile.

All risers have equal height.
All shorter steps have the same tread, t.
The longer steps have tread = 3t

The height of the staircase is
_____

The base of the staircase is
_____

3. Construct the angle of a circular arc of length 2.5 radians.
    A radian is a circular arc whose arc length equals the radius. You are free to choose your own unit of measurement for radius. Make it large enough for the drawing to be legible.
    [HINT: A radian is a small large angle and you might wish to adapt a small circular arc construction to solve the problem. The best solutions are the intelligently lazy ones. See if you can figure out a way to do the essential construction just once.]

4. Within a parallelogram with sides inclined at 60° to the base, construct half a *parabola* on the left and half an *ellipse* on the right (both left and right sides are split evenly into two congruent parallelograms).
    The base of the big parallelogram equals the length of a circular arc that subtends 120°, and height equal to twice the diameter of the circle to which the circular arc belongs.
    You are free to choose your own unit of measurement for the radius. Make it large enough for the drawing to be legible.
    [HINT: 120° is a large and so the small angle construction shown in class will not apply as such. You will have to modify the problem so that the construction will work.]

5. Read the notes on the golden section and construct the development (unfolding) of a hexagonal prism – that is, the unfolded result of the prism - where the hexagon's sides are 1¼" (32 mm) and the vertical faces are golden rectangles. Show all constructions used.
    [NOTE: There are two possible golden rectangles for the sides: one in which the side of the hexagon is the longer side of the golden rectangle and the other in which the side of the hexagon is the shorter side of the golden rectangle. Construct only one for the development.
    Do not use a protractor for this problem.