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Final prep

We will be using the following triangle 2D mesh $\mathcal{M}$, here given in `.obj` form::

```
g default
s off
v 0 0 0
v 1 0 0
v 1 1 0
v 0 2 0
v -2 0 0
v 0 -1 0
v 2 1.5 0
o object 0
f 1 2 3
f 1 3 4
f 1 5 4
f 1 5 6
f 1 6 2
f 2 7 3
f 7 3 4
```

1. How many boundary edges does $\mathcal{M}$ have? (Boundary edge: only part of *one* triangle.

2. Which vertices define $\mathcal{M}$'s convex hull? (give the numbers in the vertex list).

3. Can a 3D, nonplanar, cubic Bézier curve have points with zero curvature? Explain.

4. Give a set (numerical values and sketch) of Bézier points describing a triangular quadratic patch which is a ruled surface.

5. Give a set (numerical values and sketch) of Bézier points describing a triangular quadratic patch with negative Gaussian curvature everywhere.

6. Sketch a 2D Voronoi diagram of five points.

7. Let $\mathbf{x}(u, v)$ be a degree (m, n) 3D surface. Let $\mathbf{u}(t)$ be a degree k curve in $\mathbf{x}'$s domain. What is the degree of the composite curve $\mathbf{x}(\mathbf{u}(t))$?

8. Let a biquadratic Bézier net be given by

$$\mathbf{b}_{ij} = \begin{bmatrix} i/2 \\ j/2 \\ i^2 + j^2 \end{bmatrix}.$$

Is this a Coons-type control net? If not, fix the interior control point so that it is.