Precalculus I Functions Test 4: Concepts to Review

- Parametric equations
  - for line segment between (x_1, y_1) and (x_2, y_2): $x = (1-t)x_1 + tx_2$ $y = (1-t)y_1 + ty_2$, $0 \leq t \leq 1$
  - eliminating parameter and sketching resulting implicit function
- Solving systems of equations
  - method of substitution
  - method of elimination
- Determining the region satisfying a system of inequalities by sketching
- Conic sections
  - completing the square
  - sketching
  - derivations
  - parabolas
    - $(x-h)^2 = 4p(y-k)$ (opens up)
    - $(x-h)^2 = -4p(y-k)$ (opens down)
    - $(y-k)^2 = 4p(x-h)$ (opens to right)
    - $(y-k)^2 = -4p(x-h)$ (opens to left)
    - directrix, vertex, focus, focal length, focal width
  - circles and ellipses
    - circles $(x-h)^2 + (y-k)^2 = r^2$
    - ellipses $\dfrac{(x-h)^2}{a^2} + \dfrac{(y-k)^2}{b^2} = 1$
    - center, vertices, foci, focal axis, Pythagorean relation $c^2 = a^2 - b^2$ or $c^2 = b^2 - a^2$.
  - hyperbolas
    - $\dfrac{(x-h)^2}{a^2} - \dfrac{(y-k)^2}{b^2} = 1$ (opens right/left)
    - $\dfrac{(y-k)^2}{b^2} - \dfrac{(x-h)^2}{a^2} = 1$ (opens up/down)
    - center, vertices, foci, focal axis, Pythagorean relation $c^2 = a^2 + b^2$