KEY TERMS AND CONCEPTS, SECTIONS 9.4, 9.6 + 10.5

- Conic sections. (To re-express) parabolas, ellipses, and hyperbolas on standard forms, e.g. by translation.
  - Standard forms:
    - Parabola: $x^2 = 4py$.
    - Ellipse: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
    - Hyperbola: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.
  - Terms: Focus, (semi)major/minor axis, center, directrix, focal axis, asymptote.
- Equation for a line.
  - A line parallel to $\mathbf{v}$ is given by $\mathbf{r}(t) = \mathbf{r}_0 + t\mathbf{v}$, $-\infty < t < \infty$.
  - Distance from point to line $d = \frac{|\overrightarrow{PS} \times \mathbf{v}|}{|\mathbf{v}|}$.
- Equation for a plane.
  - A plane through the point $P_0(x_0, y_0, z_0)$ with normal $\mathbf{n} = A\mathbf{i} + B\mathbf{j} + C\mathbf{k}$ is given by $A(x - x_0) + B(y - y_0) + C(z - z_0) = 0$.
- A geometric understanding of the scalar product.
  - Distance from point to plane $d = \left|\overrightarrow{PS} \cdot \frac{\mathbf{n}}{|\mathbf{n}|}\right|$.
  - Lines of intersection of planes.
  - Angles between planes.