

Formulas for Test 3

- Vector form for a line:

$$\langle x, y \rangle = \langle x_0 + m_1 t, y_0 + m_2 t \rangle$$

- Angle between two vectors:

$$\theta = \cos^{-1} \left(\frac{\vec{v} \cdot \vec{u}}{\|\vec{v}\| \|\vec{u}\|} \right)$$

- Vector projection \vec{u} onto \vec{v}

$$\vec{w} = \frac{\vec{u} \cdot \vec{v}}{\|\vec{v}\|^2} \vec{v}$$

$$\vec{w}_{\perp} = \vec{u} - \vec{w}$$

- Distance from a point to a line:

$$d = \frac{|Ax_1 + By_1 + C|}{\sqrt{A^2 + B^2}}$$

Circle

- $(x - h)^2 + (y - k)^2 = r^2$

Parabola

- $(x - h)^2 = 4c(y - k)$
- $(x - h)^2 = -4c(y - k)$
- $(y - k)^2 = 4c(x - h)$
- $(y - k)^2 = -4c(x - h)$

Ellipse

- $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$
- $\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$

Hyperbola

- $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
- $\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$