Formulas

Formulas from Coordinate Geometry

Slope of a line (p. 82)	$m = \frac{y_2 - y_1}{x_2 - x_1}$ where m is the slope of the nonvertical line through points (x_1, y_1) and (x_2, y_2)
Parallel and perpendicular lines (p. 84)	If line l_1 has slope m_1 and line l_2 has slope m_2, then: $l_1 \parallel l_2$ if and only if $m_1 = m_2$ $l_1 \perp l_2$ if and only if $m_1 = -\frac{1}{m_2}$, or $m_1 m_2 = -1$
Distance formula (p. 615)	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ where d is the distance between points (x_1, y_1) and (x_2, y_2)
Midpoint formula (p. 615)	$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ is the midpoint of the line segment joining points (x_1, y_1) and (x_2, y_2).

Formulas from Matrix Algebra

Determinant of a 2 × 2 matrix (p. 203)	$\det\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - cb$
Determinant of a 3 × 3 matrix (p. 203)	$\det\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} = \begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = (aei + bfg + cdh) - (gec + hfa + idb)$
Area of a triangle (p. 204)	The area of a triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3) is given by $\text{Area} = \pm\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$ where the appropriate sign (±) should be chosen to yield a positive value.
Cramer's rule (p. 205)	Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ be the coefficient matrix of this linear system: $ax + by = e$ $cx + dy = f$ If $\det A \neq 0$, then the system has exactly one solution. The solution is $x = \frac{\begin{vmatrix} e & b \\ f & d \end{vmatrix}}{\det A}$ and $y = \frac{\begin{vmatrix} a & e \\ c & f \end{vmatrix}}{\det A}$.
Inverse of a 2 × 2 matrix (p. 210)	The inverse of the matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is $A^{-1} = \frac{1}{\lvert A \rvert}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{ad - cb}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ provided $ad - cb \neq 0$.