TMTH 202
MIDTERM EXAM FORMULA SHEET

CHAPTER 11: *Determinants*

Cramer's Rule:

$$x = \frac{\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} \qquad y = \frac{\begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} \qquad \Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} \neq 0$$

$$x = \frac{\begin{vmatrix} k_1 & b_1 & c_1 \\ k_2 & b_2 & c_2 \\ k_3 & b_3 & c_3 \end{vmatrix}}{\Delta} \qquad y = \frac{\begin{vmatrix} a_1 & k_1 & c_1 \\ a_2 & k_2 & c_2 \\ a_3 & k_3 & c_3 \end{vmatrix}}{\Delta} \qquad z = \frac{\begin{vmatrix} a_1 & b_1 & k_1 \\ a_2 & b_2 & k_2 \\ a_3 & b_3 & k_3 \end{vmatrix}}{\Delta}$$

CHAPTER 12: *Matrices*

$A \bullet A^{-1} = A^{-1} \bullet A = I$ and $X = A^{-1} \bullet B$

CHAPTER 14: *Quadratic Equations*

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

CHAPTER 17: *Graphs of the Trigonometric Functions*

General Sine Wave: $y = a \sin(bx + c)$

amplitude $= |a|$ period $= \frac{360°}{b}$ or $\frac{2\pi}{b}$ frequency $= \frac{b}{360°}$ or $\frac{b}{2\pi}$

phase angle $= c$ phase shift $= -\frac{c}{b}$ $\cos\theta = \sin(\theta + 90°)$

Sine Wave as a Function of Time t: $y = a \sin(\omega t + \phi)$

amplitude $= |a|$ angular velocity $= \omega$ period $= \frac{2\pi}{\omega}$

frequency $= \frac{\omega}{2\pi}$ phase angle $= \phi$ phase shift $= -\frac{\phi}{\omega}$

Compiled by: Humber College Math Department
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Addition of a sine wave and cosine wave:

$$A \sin \omega t + B \cos \omega t = R \sin(\omega t + \phi) \qquad \text{where}$$

$$R = \sqrt{A^2 + B^2} \qquad \text{and} \qquad \phi = \arctan\left(\frac{B}{A}\right)$$

Transforming between Polar and Rectangular Coordinates:

$$x = r \cos \theta \quad \text{and} \quad y = r \sin \theta$$

$$r = \sqrt{x^2 + y^2} \quad \text{and} \quad \theta = \arctan\left(\frac{y}{x}\right)$$