

Meet 3 - Cheat Sheet

Event A: Systems of Linear Equations

• For Equations:

- Substitution Method
- Elimination Method
- Points of Intersection

• For Inequalities:

- $y >$: Shade Above \leq, \geq : Solid Line
- $y <$: Shade Below $<, >$: Dotted Line

• Systems are Matrices:

$$\begin{cases} 2x + y = 4 \\ x + y = 3 \end{cases} \rightarrow \begin{bmatrix} 2 & 1 & 4 \\ 1 & 1 & 3 \end{bmatrix}$$

Solve, using RREF on your calculator.

Determinants:

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

(Add these two columns)

$$\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = \begin{vmatrix} a & b & a+b \\ d & e & d+e \\ g & h & g+h \end{vmatrix}$$

$$= aei + bfg + cdh - ceg - afh - bdi$$

Event B: Polygonal Figures & Solids

• Areas:

- Rectangle, Square, Rhombus & Parallelogram: $A = b \cdot h$
- Trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$

- Regular Polygons: Break into triangles, or...

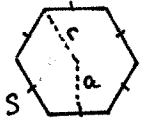
Let n = Number of Sides

Then,

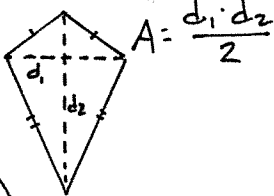
$$A = \frac{s^2 n}{4 \tan(180/n)^\circ}$$

$$A = \frac{r^2 n \cdot \sin(360/n)^\circ}{2}$$

$$A = a^2 n \cdot \tan(180/n)^\circ$$

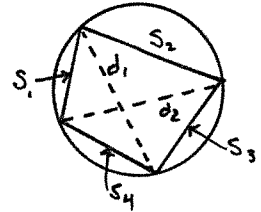


- Kite:



• Cyclic Quadrilaterals:

- Squares, Rectangles,
- Trapezoid: if Isosceles
- Kite: if Two Right Angles



- Ptolemy's Thm: $s_1 \cdot s_3 + s_2 \cdot s_4 = d_1 \cdot d_2$

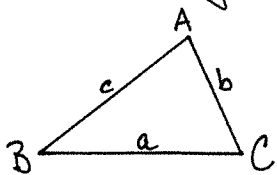
Prism: $V = A_{\text{base}} \cdot h$

$$SA = 2A_{\text{base}} + P_{\text{base}} \cdot h$$

Pyramid: $V = \frac{1}{3} A_{\text{base}} \cdot h$

$$SA = A_{\text{base}} + \frac{1}{2} P_{\text{base}} \cdot l$$

Event C: Trigonometry



• Law of Sines:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

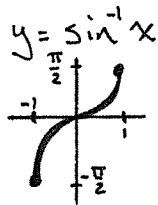
• Law of Cosines:

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$

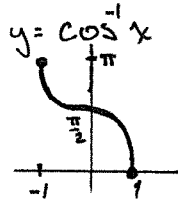
$$c^2 = a^2 + b^2 - 2ab \cdot \cos C$$

Inverses:



(a.k.a. $y = \arcsin x$)

(It means $x = \sin y$)



(a.k.a. $y = \arccos x$)

(It means $x = \cos y$)

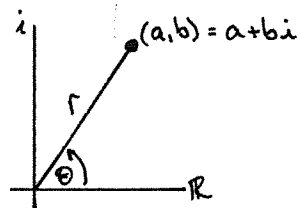
* De Moivre's Thm:

If $z = a + bi$

Then

$$* z^n = r^n (\cos(n\theta) + i \cdot \sin(n\theta))$$

Where, on the Complex Plane,



Also,

$$* e^{ix} = \cos x + i \cdot \sin x$$

Event D: Exponents & Logarithms

$$x^{1/2} = \sqrt{x}$$

$$x^{1/n} = \sqrt[n]{x}$$

$$x^{p/n} = \sqrt[n]{x^p}$$

$$x^0 = 1$$

Properties:

$$x^a \cdot x^b = x^{a+b}$$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$(x^a)^b = x^{a \cdot b}$$

Logarithms:

If $x^p = L$

Then,

$$\log_x L = p$$

Properties:

$$\log(a \cdot b) = \log a + \log b$$

$$\log\left(\frac{a}{b}\right) = \log a - \log b$$

$$\log a^b = b \cdot \log a$$

Change of Base Formula:

$$\log_b a = \frac{\log_n a}{\log_n b} = \frac{\ln a}{\ln b} = \frac{\log a}{\log b}$$