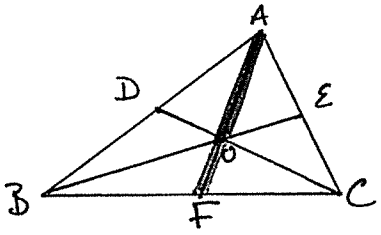
Meet 2 - Cheat Sheet

Event B: Triangular Figures & Solids.

- **Triangles:**

Medians: Vertex → Midpoint

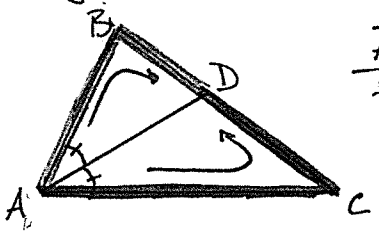


$\overline{AO} = 2\,\overline{OF}$

$\overline{BO} = 2\,\overline{OE}$

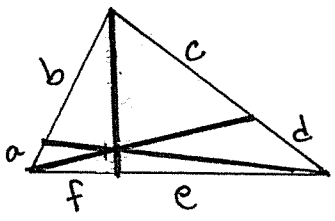
$\overline{CO} = 2\,\overline{OD}$

Angle Bisector: 2 equal angles



$$\frac{\overline{AB}}{\overline{BD}} = \frac{\overline{AC}}{\overline{CD}}$$

Ceva's Theorem: Any three line segments that meet at a point.



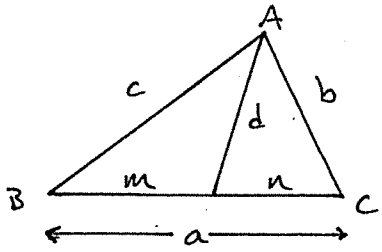
$$\frac{a}{b} * \frac{c}{d} * \frac{e}{f} = 1$$

* Go around the triangle

OR

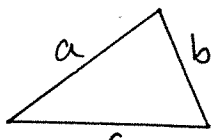
$$ace = bdf$$

Stewart's Theorem: Be careful how you label the triangle.



$$(man) + (dad) = (bmb) + (cnc)$$

Hero's Formula: for Area



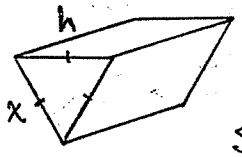
$$s = \frac{a+b+c}{2}$$

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

- **Solids:**

Prisms:

- In General:



$$V = A_{base} \cdot h$$

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

- For Equilateral Bases:

$$V = \frac{\sqrt{3}}{4} x^2 h$$

$$SA = \frac{\sqrt{3}}{2} x^2 + 3xh$$

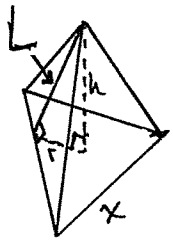
Pyramid:

- In General:

$$V = \frac{1}{3}(A_{base})h$$

$$SA = (A_{base}) + \frac{P_{base} \cdot L}{2}$$

$$L = \sqrt{r^2 + h^2}$$



- If a Tetrahedron:

(All equilateral triangles)

$$V = \frac{\sqrt{3}}{12} x^2 h$$

$$SA = \sqrt{3}\, x^2$$

Event C: Trigonometry

- **Sum & Difference:**

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

- **Double Angle:**

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

- **Half Angle:**

$$\sin\left(\tfrac{1}{2}A\right) = \pm\sqrt{\frac{1-\cos A}{2}}$$

$$\cos\left(\tfrac{1}{2}A\right) = \pm\sqrt{\frac{1+\cos A}{2}}$$

$$\tan\left(\tfrac{1}{2}A\right) = \pm\sqrt{\frac{1-\cos A}{1+\cos A}}$$

- **Power Reduction:**

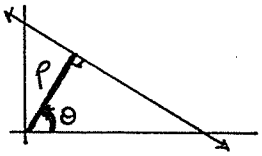
$$\sin^2 A = \frac{1-\cos 2A}{2}$$

$$\cos^2 A = \frac{1+\cos 2A}{2}$$

$$\tan^2 A = \frac{1-\cos 2A}{1+\cos 2A}$$

Event D: Analytical Geometry of Circles & Lines

- **Lines:**
  - Point-Slope Form: $y - y_1 = m(x - x_1)$
  - Slope-Intercept Form: $y = mx + b$
  - Intercepts Form: $\frac{x}{a} + \frac{y}{b} = 1$ (a: x-int, b: y-int)
  - Normal Form: $x \cdot \cos\theta + y \cdot \sin\theta = p$



- **Circles:**

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

Center: $(-h, -k)$

Radius: r