

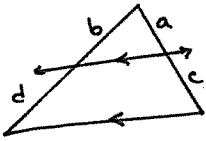
# Meet 5: Cheat Sheet

Event A: Puzzle Problems

Event D: Variations of Last year's AMC 12

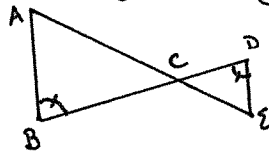
## Event B: Congruence & Similarity

- Segments Intercepted by Parallel Lines.

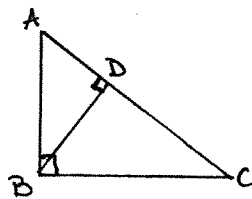


$$\frac{a}{c} = \frac{b}{d}$$

- Identify Similar or Congruent Figures

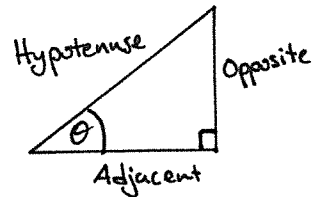


$$\triangle ABC \sim \triangle EDC$$



$$\triangle ABC \sim \triangle ADB \sim \triangle BDC$$

- Elementary Trig. Ratios



$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}}$$

$$\cos \theta = \frac{\text{Adj}}{\text{Hyp}}$$

$$\tan \theta = \frac{\text{Opp}}{\text{Adj}}$$

## Event C: Counting & Probability.

- Basic Counting Principle:

S shirts, T ties & C suitcoats  
 $\rightarrow S \times T \times C$  outfits

- "AND" Probability:

$$P(a \text{ AND } b) = P(a) \cdot P(b)$$

(Watch out for Replacement)

- "OR" Probability:

$$P(a \text{ OR } b) = P(a) + P(b)$$

- Binomial Expansion:

The  $n^{\text{th}}$  Term of  $(a+b)^p$

$$\frac{p!}{k!(p-k)!} a^k b^{p-k}$$

where  $k = n-1$

- How Many Ways Can it Happen?

Does Order Matter?

- If yes: Permutations

$${}_n P_r = \frac{n!}{(n-r)!}$$

Then check...

- + Repetition: Identical Objects  
 If yes:  $\div (p! q!)$

- + Circular: Like a round table with no special seat or a bracelet with no clasp.

If yes:  $\div n$

- + Reflexive: Can you flip it over?  
 If yes:  $\div 2$

- If no: Combinations

$${}_n C_r = \frac{n!}{r!(n-r)!}$$

(Dealing a hand of Cards)