HW #1
- Read syllabus, add Khan Academy coach code, and fill out survey
- Read Ch 1.
  Note that you are responsible for knowing all definitions, theorems, and formulas in your text, even if not explicitly gone over in class.
  Key words are highlighted in your textbook in red.

HW #2
- Ch 1 Review Problems pp. 36-38 - all problems from sets I, II, & III
  Due Friday. Show all of your own work!

HW #3
- Ch 2 Review pp.71-74 #1-50 due Wednesday, 14 Nov

TEST #1 on Ch 1-2 - Wednesday, 14 Nov

21. At a sports banquet there are 100 famous athletes. Each one is either a football player or a basketball player. At least one is a football player. Given any two of the athletes, at least one is a basketball player. **How many of the athletes are football players, and how many are basketball players? Construct an indirect argument to explain your reasoning.**

Theorem: There are 99 basketball players and only 1 football player.

(Indirect) Proof:

Suppose there are more than one football players.

If there are more than one football players, then a group of two athletes could consist of two football players.

This contradicts that given any two athletes, at least one is a basketball player.

Therefore, our initial assumption is false, and there is only one football player.

2.5 – A Deductive System

To avoid circular definitions, mathematics leaves certain terms undefined.

Those which we have seen so far include: point, line, plane.

These undefined terms can be used to define other terms, for example,

Def: Points are collinear iff there is a line that contains all of them.

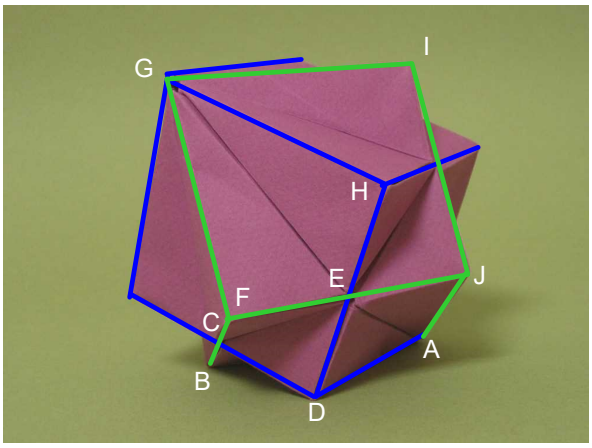
Def: Lines are concurrent iff they contain the same point.

Just as it is impossible to define everything without going around in circles, it is impossible to prove everything. We leave some statements unproved, and use them as a basis for building proofs of other statements.

Def: A postulate is a statement that is assumed to be true without proof.

Postulate 1: Two points determine a line.

Postulate 2: Three noncollinear points determine a plane.

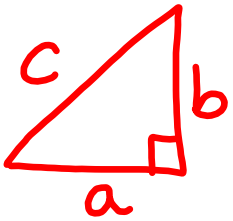


Determine if the following statements are true or false:

19. Points B, C, and F are collinear. T
20. Points B and C determine a line. T
21. Points F, E, and J are coplanar. T
22. Points F, E, and J determine a plane. F (because they are collinear)
23. Points A, E, and G are collinear. F (but they are coplanar and define a plane)
24. Points A, B, C, and J are coplanar. T
25. Lines DH, FJ, and EG are concurrent. T (@ point E)

2.6 - Some Famous Theorems of Geometry

The Pythagorean Theorem: The square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides.



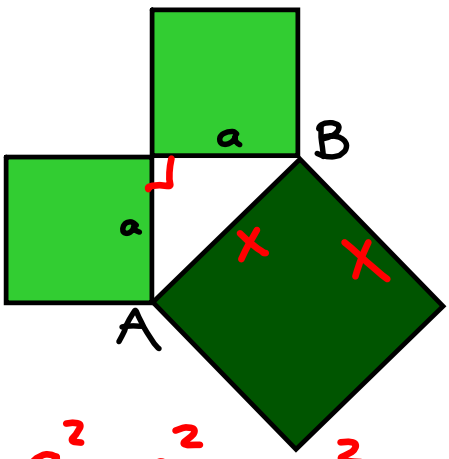
$a^2+b^2=c^2$

The Triangle Sum Theorem: The sum of the angles in a triangle is 180°.

Circle Theorems:

If the diameter of a circle is d, then its circumference is πd. $(2\pi r)$

If the radius of a circle is r, then its area is πr^2.



$a^2+a^2=x^2$

34. The area of the light green square is

a^2

35. The combined area of the two light green squares is

$a^2+a^2=\boxed{2a^2}$

36. The area of the dark green square is

$x^2=\boxed{2a^2}$

41. "The area of a circle is half of the circumference multiplied by half of the diameter."
~ 6th century Indian astronomer Aryabhata

Is this true? Yes!

$$\left[\tfrac{1}{2}C\right]\left[\tfrac{1}{2}D\right] = \left[\tfrac{1}{2}(2\pi r)\right]\left[\tfrac{1}{2}(2r)\right]$$

$$= (\pi r)(r) = \pi r^2 \quad \checkmark$$