Solids

Requirements:

1. Is representation unique?
2. What is its domain? Is method general purpose or restricted to a few types?
   - Any shape, size, kind
3. Is modeling technique accurate in its representation (depends on application)
4. Is it efficient?
   - time (computation complexity)
   - space (e.g., storage)
5. Can it be 'combinable' with other solids to make a single model?

The efficient/accurate tools usually have a limited domain.

The first method mentioned in the text is not a method (Regularized Boolean ops)
It is combining solids and non-solids, not a basic modeling method
- e.g., doughnut and its hole, dumbbell, double dip ice cream cone.
It must have one of the other methods to make a solid to begin with.

Methods:

Primitive Instance — program that builds solid
- used for CAD/CAM (led to automation)
- build a gear with various input parameters

1) yes
2) very limited
3) yes, very accurate (enough to manufacture)
4) yes
5) no

- each primitive requires a new program

Sweep — 2D view that is moved through space
- manufacturing technique (sandwich & slice)
  - stamped parts, castings

1) yes
2) limited
3) yes as accurate as prim
4) as good as it is. (both storage & computing)
5) no (can be, but a nightmare)
Spatial Partitioning
- fill shape with "prop-up" ball
- fill with a primitive solid - no need to have a sphere, generally small "single" primitives
- either a sphere or a cube - sphere size most prevalent

CSG
- Extended primitive Intersect - very popular
- primitive in CSG can be combined using intersection - ability to create one primitive - built with B-reps
- system converts do primitives

Conventional Solid Geometry
- Primitives - very popular
- combine set of primitive solids - sphere, cone, pyramids, ellipsoids, cubes, etc...
- allow for combining

B-Rep or "Boundary Representation"
- 1) not unique
- 2) hollow vs solid appears the same
- 3) yes, even over all
- 4) yes, worst complexity above (less context in the notion, David said)
- 5) yes

50 SHEETS