

Ged geometry - from start to finish

I. Identification and properties of common shapes - planar (shapes found on the formula sheet for GED)

- A. Circle (radius, diameter, pi)
- B. Square (all sides equal and perpendicular to each other)
- C. Rectangle (opposite sides equal in length and sides perpendicular)
- D. Parallelogram (opposite sides parallel but not perpendicular, height is perpendicular)
- E. Triangle (right, isosceles, equilateral and scalene, height perpendicular to base)
- F. Trapezoid (parallel sides are bases, height must be perpendicular to base)

Emphasis suggestions:

- 1. Understanding the relationship between pi, radius and diameter
- 2. The height of an object is not necessarily the side length of the side. For example, the height of a parallelogram or trapezoid
- 3. Perpendicular means at an angle of 90 degrees to each other

II. Perimeter of common shapes

- A. Perimeter always involves addition (exception of circle)
 - 1. No formula needed! Add up ALL of the sides
 - a. how do you add up sides of a circle?
 - 1. Fancy word for perimeter of a circle is circumference
- B. Key words
 - 1. Distance around, revolution (circle), laps, enclose, surround, outline, encircle, border, frame
- C. Finding perimeter with lengths given in different units
 - 1. All units of measure must be the same
 - a. Convert to same units before you add (1' + 1" in does not equal 2')
- D. Perimeter word problems
 - 1. Simple perimeter problems
 - 2. Finding length of a side given the perimeter
 - 3. Perimeter problems where the word perimeter is not used
- E. Perimeter of compound shapes

Emphasis suggestions:

- 1. Perimeter in life - where do we see it? We see it in interior design and sports such as cross country running
- 2. No need for a formula! Perimeter always involves addition (except circle)

3. Perimeter is always a unit of length

III. Pythagorean Theorem

- A. How do solve for a, b, or c. C is always the longest side. Shorter side corresponds to lower angle. Knowing the difference between legs and hypotenuse

Emphasis suggestions:

1. Do not get bogged down in the formula - two sides of a triangle never add up to the third side. Have students try it with two 2 inch long items and a 4 inch long item - can they make a triangle without overlapping?
2. Pythagorean in life - ladder leaning against a building, handicap ramp, construction
3. Pythagorean triples are 3-4-5, 5-12-13, and 7-24-25.

IV. Area of common shapes

- A. Area always involves multiplication
 1. Introduce area formulas for shapes
 2. Define what height is (always perpendicular to base)
- B. Key words
 1. Cover, square units, paint, carpet, tile, glass
- C. Finding area with different units (introduces conversions)
 1. Cannot multiply feet by yards etc, convert before you do calculation
- D. Area word problems
 1. Simple area problems (finding area given dimensions)
 2. Finding missing dimension given area
 3. Area word problems where the word area is not used
- E. Area of compound shapes (adding areas)
 1. Finding area of two of the same shape
 2. Finding area of an L shaped object where you have to draw in rectangles
 3. Finding area of two different shapes (basketball court)
- F. Area of compound shapes (subtracting areas)
 1. Finding area of shaded region
 - a. Rectangle or square within a rectangle (picture frame for example)
 - b. Circle within a circle (mirror with wood frame/ tablecloth hanging down)

Emphasis Suggestions:

1. Area is always in square units and the units must match (inches and inches)
2. Real life area problems such as cost of carpeting or painting a room
3. Bring out formula sheet for ged and start going over it

V. Identification and properties of 3-dimensional shapes/solids

- A. Rectangular prism (fancy word for a box) and cube
- B. Right prism
 - 1. A right prism is any polygon bases with sides perpendicular to that base
 - a. Triangular tube, (have a handout with pictures perhaps)
- C. Cylinder
 - 1. height and radius, examples of cylinders - soup can, pipe, tube
- D. Cone
 - 1. Height and radius, examples of cones - ice cream cone, party hat
- E. Square pyramid
 - 1. The base is a square so the sides of the base are equal
- F. Sphere
 - 1. Only measurement needed is radius or diameter -ball, orb

Emphasis Suggestions:

- 1. Able to identify the above given shapes in the world around you

VI. Surface area of 3-dimensional shapes/solids

- A. What is surface area? (square units)
 - 1. Surface area is the sum of the area of all the sides of a solid
- B. Key words (material, wrapping paper, cardboard for a box)
- C. Formulas and where they come from
- D. Finding the surface area
- E. Surface area in word problems
- F. Finding missing dimensions given surface area

Emphasis Suggestions:

- 1. Surface area is like the area of a 3 dimensional object
- 2. Difference between area and surface area
- 3. surface area being in square units
- 4. Show where formula for surface area of rectangular prism and cube comes from - perhaps derive it
- 5. Don't forget ged formula sheet

VII. Volume of solids

- A. What is volume (cubic units)
- B. Key words (fill, capacity, space, hold)
- C. Formulas and where they come from
 - 1. Volume is the area of the base (B) times the height

- a. Definition of capital B and little b
- D. Calculating volumes of different solids and compound solids
- E. Volume word problems
- F. Finding missing dimensions given the volume

Emphasis Suggestions:

1. Volume always in cubic units and units must match
2. Volume in real life (pool, air in a balloon, concrete)
3. Show how $V=Bh$ is evident in the volume of a cylinder formula and rectangular prism formula (from the GED formula sheet)