

## Developing GED<sup>®</sup> Test Geometric Reasoning Skills

### **COABE 2018**

## **Session Objectives**



- Explore strategies and activities to improve students' geometric reasoning skills
- Practice learning activities
- Explore resources

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# Building Geometric Reasoning Skills



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- **Q.4** Calculate dimensions, perimeter, circumference, and area of two-dimensional figures
- Q.5 Calculate dimensions, surface area, and volume of threedimensional figures

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#### What to look for in student work (Q.4/5)

The student can

- identify the dimensions of a geometric figure from a diagram, then substitute the values for those dimensions into the appropriate formula for geometric measurement, then calculate the resulting numerical expression.
- · calculate the perimeter of polygons.
- identify the shapes that comprise a composite figure.

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## **Tangrams**

- · Originated in China
- · Its invention is unrecorded in history.
- The word "tangram" may have come from the Tanka people who were traders who played this puzzle and past it on via sailors.
- The word might come from an obscure English word "trangram" which means puzzle or trinket.
- Became popular during the 19th century in Europe and America.



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## **Tangrams**

Tangram puzzles are made of seven shapes:

- 5 triangles
- 1 square
- 1 parallelogram

**Tangrams Tangrams** Teach math in an interesting Reinforce geometric principles and ratios manner · Given a specified side length, find the area of each of the smaller shapes · Recreate given shapes making up the tangram. Create new shapes ٠ Determine different ways all 7 shapes · Integrate mathematical skills be used to make a square. Given a specified side length, using manipulatives (e.g., determine individual side lengths What fraction of the original (and/or perimeters) of each of the 7 shape are each of the 7 pieces. pieces?) Find the smallest perimeter using all 7 shapes. The maximum perimeter. GED GED











Theorem: The measure of any side of a triangle must be LESS THAN the sum of the measures of the other two sides. (This same concept forms the basis for other questions in the domain of Geometry.)



The Triangle Inequality Theorem is the mathematical statement of the old adage, "The shortest distance between two points is a straight line," If you don't travel along the straight line, you travel two sides of a triangle, and that trip takes longer,



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## Pythagorean in Real-Life

A customer would like a bonus room to be added to an existing home. The new room is to be 26' x 24' with an 8' ceiling and a 2' roof overhang. The ridge of the roof is to be centered over the 24 foot wall and 5 feet above the top of the wall of the bonus room. Assuming the builder uses standard 4' x 8' plywood sheets, determine how many plywood sheets will be needed to cover the walls of the bonus room (not accounting for doors or windows)?

Divide the area of the walls by the area of plywood sheet 26' x 8' (2 walls) + 24' x 8' (2 walls) 4' x 8' plywood sheet

(2 x 208 sq. ft.) + (2 x 192 sq. ft.) / 32 sq. ft. = 416 sq. ft. + 384 sq. ft. / 32 sq. ft. =

800 sq. ft. / 32 sq. ft. =

25 sheets of plywood for the walls







Figure	SA Formula	V Formula	
Rectangular/right prism	SA = ph + 2B	V = Bh	
Cylinder	$SA = 2\pi rh + 2\pi r^2$	$V = \pi r^2 h$	
Pyramid	$SA = \frac{1}{2}ps + B$	V = 1/3Bh	
Cone	$SA = \pi rs + \pi r^2$	$V = 1/3\pi r^2 h$	
Sphere	$SA = 4\pi r^2$	$V = 4/3\pi r^3$	















CHALLENGES ARE GIFTS THAT FORCE US TO SEARCH FOR A NEW CENTER OF GRAVITY. DON'T FIGHT THEM. JUST FIND A NEW WAY TO STAND

- OPRAH WINFREY





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