MATH 215 – MATHEMATICS FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS III | 3 CREDITS

SYLLABUS

CATALOG DESCRIPTION

Develops basic geometric concepts including rigid transformations and congruence; dilations and similarity; length, area and volume; systems of measurement and unit conversions; connections to coordinate geometry. Student activities, investigations and problem solving are emphasized throughout

Prerequisites: Grade of "C" or better in MATH 121

Semester Offered: Spring

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

General Learning Outcomes

Upon successful completion of the course, the student will be able to…

Properties of Geometric Shapes

1. Measurement
2. Triangle Congruence and Similarity
3. Transformations
4. Coordinate Geometry

5. Problem Solving

Specific Learning Outcomes

Upon successful completion of the course, the student will be able to…

1.1) Classify polygons based on properties such as number of sides, side lengths, and angle measures
1.2) Identify and draw polygons and circles that have given properties
1.3) Identify, describe, and draw rectangular solids and other polyhedra, cylinders, spheres and cones

2.1) Define length, area and volume and explain the differences through models
2.2) Define perimeter and find the perimeter of polygons
2.3) Explain and demonstrate why multiplication applies to the area of a rectangle and volume of a rectangular solid
2.4) Decompose polygonal regions into simpler polygons to find the area
2.5) Develop and use formulas for parallelograms, triangles, and prisms
2.6) Measure objects with appropriate tools with standard and non-standard units
2.7) Describe the metric system and US customary system and convert units within a system
2.8) Estimate and measure angles
2.9) Solve problems involving measurements of time, length, area, volume, and mass
2.10) Calculate the circumference, radius, diameter and area of circle and explain the relationship between Pi and circumference and area.
2.11) Use the properties of parallel lines and parallel line cut by a transversal to reason and solve problems about angles
2.12) Know and used the Pythagorean Theorem and its converse.
2.13) Use the fact that the sum of angles in a triangle is 180□ to solve problems
2.14) Find the volume of prisms, pyramids, cylinders, cones and spheres
2.15) Describe the effect of scaling on length, area, and volume
2.16) Use units that are products and units that are rates in application problems 2.17) Explain the process for unit conversion

3.1) Define congruent triangles and use their properties to solve problems
3.2) Prove or disprove congruence of triangles using the SSS, SAS, ASA properties of congruent triangles
3.3) Define similar triangles and use their properties to solve problems
3.4) Compare and contrast congruent and similar figures

4.1) Describe translations, reflections, and rotations using informal language and formal terminology
4.2) Identify and describe the image of a polygon under a specified transformation
4.3) Recognize that length, area, volume, and angle measurement are preserved by rigid transformations
4.4) Describe the relationship between congruence and rigid transformations
4.5) Describe the connection between symmetry and rigid transformations
4.6) Describe dilations using informal language and formal terminology
4.7) Identify and describe the image of a polygon under a dilation in the Euclidean and coordinate plane
4.8) Describe the effect of dilation on length, area, volume, and angle measurement
4.9) Describe the relationship between similarity and dilation

5.1) Solve problems using points in the coordinate system
5.2) Describe Cartesian coordinates and how they link Geometry and Algebra

5.3) Represent polygons in the coordinate plane
5.4) Write algebraic equations defining lines

6.1) Make sense of problems and persevere in solving them.
6.2) Reason abstractly and quantitatively.
6.3) Construct viable arguments and critique the reasoning of others.
6.4) Model with mathematics
6.5) Use appropriate tools strategically
6.6) Attend to precision.
6.7) Look for and make sense of structure
6.8) Use mathematical notation properly