UNIT OF STUDY

Title: Pythagorean theorem, measuring, and real world **Subject/Course**: Algebraic Connections **Length:** 10 days

Topic: CS3 unit 9 **Grade:** 12th **Designer:** Prado

UNIT GOALS AND EXPECTATIONS

IMPORTANT CONCEPTS/UNDERSTANDINGS:

- Coordinate geometry can be used to represent and solve problems with midpoint, length of a line segment and Pythagorean Theorem.
- Changing the dimensions changes the perimeter, area, and volume.
- Linear, piece-wise, and step functions can be related to real world problems in many ways.

ESSENTIAL QUESTIONS:

- What is the midpoint of a line segment?
- What is the hypotenuse of a right triangle?
- How does a change in dimension change the perimeter, volume, and area?
- How do I figure sales tax on an item?
- What is simple interest?
- What is constant depreciation and appreciation?
- What is an arithmetic sequence?
- How do I figure income tax?
- How do I know how much postage to put on a letter or package?
- If I am a salesperson, how do I figure my commission?
- What is the Pythagorean Theorem?
- How is the distance between two points on a number line determined?
- What are the two parameters needed to define an arithmetic sequence?

STUDENT LEARNING EXPECTATIONS:

SEI.3AC.4 Use, with and without appropriate technology, coordinate geometry to represent and solve problems including midpoint, length of a line segment and Pythagorean Theorem.

SEI.3.AC.5 SLE 5. Determine and describe, with and without appropriate technology, the resulting change in the perimeter, area, and volume when one or more dimensions change (apply this idea in solving real world problems)

SEI.3.AC.6 SLE 6. Apply linear, piece-wise and step functions to real world situations that involve a combination of rates, proportions and percents such as sales tax, simple interest, social security, constant depreciation and appreciation, arithmetic sequences, constant rate of change, income taxes, postage, utility bills, commission, and traffic tickets.

SPECIFIC DECLARATIVE KNOWLEDGE – What I know

- Explain vocabulary words: midpoint, line segment, hypotenuse, right triangle, sales tax, simple interest, depreciation, appreciation, arithmetic sequence, income tax, and commission
- Identify a midpoint
- Identify a hypotenuse
- Identify a right triangle
- Apply sales tax to an item that was bought
- Apply simple interest to money invested
- Applying the changes of parameters to a problem to find the changes in perimeter, area, and volume
- Apply constant depreciation or appreciation to items purchased

SPECIFIC PROCEDURAL KNOWLEDGE – What I need to do

- Find the midpoints of line segments
- Find the length of line segments
- Find the length of hypotenuse of a right triangle
- Find the length of a side of a right triangle
- Finding the effects of changing 1 and 3 dimensional parameters to 1-d, 2-d, and 3-d objects
- Solve the amount of sales tax it will cost when purchasing certain items
- Find how much simple interest will be added to money that is invested
- Find how much social security is paid each year on earnings
- Apply constant depreciation and appreciation to

♦ Identify an arithmetic sequence ♦ Apply constant rate of change to real world problems	objects that were purchased or will be purchased ♦ Solve for the missing number in an arithmetic sequence ♦ Determine how much it will cost to send a package or letter with the current postage rates

UNIT ASSESSMENTS
(Include tasks related to Dimensions 3 and 4 and Bloom's Taxonomy)

Traditional Assessments:	**Other Evidence of Learning:**
Unit 9 exam Vocabulary quiz Quizzes	Homework Class work Getting started exercises

ACTIVITIES AND LEARNING EXPERIENCES	Resources
Midpoints and lengths of line segments ♦ S will learn vocabulary using the 4-step process: midpoint and line segment ♦ S will do Getting Started activity sheet ♦ T will model how to find the midpoint of line segments ♦ S will do in-class worksheet on finding the midpoint of line segments ♦ T will go over worksheet ♦ T will model how to find the length of line segments ♦ S will do in-class worksheet on finding the length of line segments ♦ T will go over worksheet and assign homework	♦ 4-step vocabulary sheets ♦ Getting Started problems ♦ Worksheets on find the midpoint and length of line segments ♦ Smart board ♦ Calculators (as needed)
Finding the length of the hypotenuse and side of a right triangle ♦ S will learn vocabulary words: hypotenuse and right triangle ♦ S will do Getting Started activity sheet ♦ T will model how to find the length of the hypotenuse of a right triangle ♦ S will do in-class worksheet on finding the length of the hypotenuse of a right triangle ♦ T will go over worksheet ♦ T will model how to find the length of a side of a right triangle ♦ S will do in-class worksheet on finding the length of a side of a right triangle ♦ T will go over worksheet and assign homework	♦ Getting Started problems ♦ Worksheets on finding the length of the hypotenuse and side of right triangle ♦ Smart board ♦ Internet (webpages will be entered as I find them)
Describe the effects of changing 1 dimensional parameters to 2-d and 3-d objects ♦ S will do Getting Started activity sheet ♦ T will model how to describe the effects of changing 1 dimensional parameters to 2-d objects ♦ S will do in-class worksheet on describing the effects of changing 1 dimensional parameters to 2-d objects ♦ T will go over worksheet ♦ T will model how to describe the effects of changing 1 dimensional parameters to 3-d objects ♦ S will do in-class worksheet on describing the effects of changing 1 dimensional parameters to 3-d objects	♦ Getting Started problems ♦ Worksheets on describing the effects of changing 1 dimensional parameters to 2-d and 3-d objects ♦ Smart board ♦ Websites that show different 2-d and 3-d objects

♦ T will go over worksheet and assign homework	
Describe the effects of changing 3 dimensional parameters to 1-d and 2-d objects	
♦ S will do Getting Started activity sheet ♦ T will model how to describe the effects of changing 3 dimensional parameters to 1-d objects ♦ S will do in-class worksheet on describing the effects of changing 3 dimensional parameters to 1-d objects ♦ T will go over worksheet ♦ T will model how to describe the effects of changing 3 dimensional parameters to 2-d objects ♦ S will do in-class worksheet on describing the effects of changing 1 dimensional parameters to 2-d objects ♦ T will go over worksheet and assign homework	♦ Getting Started problems ♦ Worksheets on describing the effects of changing 3 dimensional parameters to 1-d and 2-d objects ♦ Smart board ♦ Websites that show 2-d and 3-d objects
Sales Tax and Simple Interest	
♦ S will learn vocabulary words: sales tax and simple interest ♦ S will do Getting Started activity sheet ♦ T will model how to solve for the sales tax amount on purchases ♦ S will do in-class worksheet on finding the sales tax amount on purchases (students will have access to newspaper and such to find items with prices and figure the sales tax and total end cost of the items) ♦ T will go over worksheet ♦ T will model how to calculate simple interest using the formula I=prt ♦ S will do in-class worksheet on calculating simple interest using the formula I=prt ♦ T will go over worksheet and assign homework	♦ Getting Started problems ♦ Worksheets on sales tax and simple interest ♦ Smart board ♦ Newspapers and sales ads ♦ Calculators
Social security rates and constant depreciation	
♦ S will learn vocabulary word: depreciation ♦ S will do Getting Started activity sheet ♦ T will model how much social security a person pays (depending on their earnings) ♦ S will do in-class worksheet on finding how much social security a person pays (depending on their earnings) ♦ T will go over worksheet ♦ T will model how to calculate constant depreciation of items that were purchased ♦ S will do in-class worksheet on calculating constant depreciation of items that were purchased ♦ T will go over worksheet and assign homework	♦ Getting Started problems ♦ Worksheets on social security rates and constant depreciation ♦ Smart board ♦ Internet information on up to date social security rates ♦ Calculators
Constant appreciation and arithmetic sequences	
♦ S will learn vocabulary words: appreciation and arithmetic sequence ♦ S will do Getting Started activity sheet ♦ T will model how to calculate constant appreciation of items purchased ♦ S will do in-class worksheet on calculating constant appreciation of items that were purchased ♦ T will go over worksheet ♦ T will model how to find the missing number in an arithmetic sequence ♦ S will do in-class worksheet on finding the missing number in an arithmetic sequence ♦ T will go over worksheet and assign homework	♦ Getting Started problems ♦ Worksheets on constant appreciation and arithmetic sequences ♦ Smart board ♦ Internet information on up to date rates of appreciation on certain items ♦ Calculators

Constant rate of change and income tax ◆ S will learn vocabulary words: income tax ◆ S will do Getting Started activity sheet ◆ T will model how to find what the answer will be if an item has a constant rate of change ◆ S will do in-class worksheet on finding what the answer will be if an item has a constant rate of change ◆ T will go over worksheet ◆ T will model how to determine the income tax of different level salaries ◆ S will do in-class worksheet on determining the income tax of different salaries ◆ T will go over worksheet and assign homework	◆ Getting Started problems ◆ Worksheets on constant rate of change and income tax ◆ Smart board ◆ Internet information on income tax rates ◆ Calculators
Postage rate and utility bills ◆ S will do Getting Started activity sheet ◆ T will model how to find out how much it will cost in postage for different weights and sizes of letters and packages ◆ S will do in-class worksheet on finding the amount of postage needed to ship certain items in the mail ◆ T will go over worksheet ◆ T will model how to calculate utility bills using wattage and price per watt ◆ S will do in-class worksheet on calculating utility bills using wattage and price per watt ◆ T will go over worksheet and assign homework	◆ Getting Started problems ◆ Worksheets on postage rates and utility bills ◆ Smart board ◆ Local information on utility bill rates (cost per watt) ◆ Internet information on up to date postage rates ◆ Scales ◆ Different size letters and packages to weigh and find the cost of shipping
Commission and traffic tickets ◆ S will learn vocabulary word: commission ◆ S will do Getting Started activity sheet ◆ T will model how to figure the commission earned when selling certain items ◆ S will do in-class worksheet on how to figure the commission earned when selling certain items ◆ T will go over worksheet ◆ T will model how to calculate the cost of a traffic ticket when going so much over the speed limit and if wearing a seat belt or not ◆ S will do in-class worksheet on calculating the cost of a traffic ticket when going so much over the speed limit and if wearing a seat belt or not ◆ T will go over worksheet and assign homework	◆ Getting Started problems ◆ Worksheets on commission and traffic tickets ◆ Smart board ◆ Local police officers information on cost of traffic tickets and seat belt fees ◆ Internet information on commissions paid for selling cars and such
Career Connections	
Police officers, salesmen/women, utility companies, post office workers, IRS, Bankers, Social Security Commission, and retailers	