**MEASUREMENT PROJECT**

**NAME(S):**

**GROUP NAME:**

**CLASS:**

**DATE**: June 15, 2019

The goals of this project are to:

1) prepare a quote/estimate for a garden or pool, and

2) present your quote/estimate to the class via a manner of your choice.

This is a group project and you will be competing against the other groups. All group members are responsible for all the content and will receive the same grade. But first, we need to review a little geometry.

**PART A – GEOMETRY**

A1 Definitions. In your own words, define the following.

Perimeter:

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Area:

>

Volume:

>

A2 Circles

What are two formulas for the perimeter of a circle?

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What is the common formula for the area of a circle and the associated mnemonic?

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In your own words, what is Pi?

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What type of number is Pi?

>

Is 3.14 or 22/7 Pi? Why do we use these instead of Pi?

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What is Pi rounded to the 9th decimal place?

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A3 Squares

Define a square in your own words.

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What is the formula for the perimeter of a square with side “s”?

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What is the formula for the area of a square with side “s”?

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A4 Rectangles

Define a rectangle in your own words.

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What is the formula for the perimeter of a rectangle with length “l” and width “w”?

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What is the formula for the area of a rectangle with length “l” and width “w”?

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A5 Parallelograms

Define a parallelogram in your own words.

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What is the formula for the area of a parallelogram with base “b” and height “h”?

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A6 Trapezoids

Define a trapezoid in your own words?

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What are two formulas for the area of a trapezoid with base “b” and heights “h1” and “h2”?

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A7 Triangles

Define a triangle in your own words.

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What is an equilateral triangle?

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What is a scalene triangle?

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What is an isosceles triangle?

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What is a right triangle?

>

Can you have a right, isosceles triangle? Why or why not?

>

What is an obtuse triangle?

>

What is an acute triangle?

>

Can you have a right, obtuse triangle?

>

What is the formula for the area of a triangle with base “b” and height “h”?

>

The angles of a triangle always add to what?

>

True or False? When you add the lengths of two sides of a triangle, the sum is always more than the remaining side.

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A8 Volume

For many shapes, you can find the volume by taking the area and multiplying by the height.

What is the formula for the volume of a cube with side “s”?

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What is the formula for the volume of a box with sides “l”, “w” and “h”?

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What is the formula for the volume of a cylinder with radius “r” and height “h”?

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What is the formula for the volume of a cone with radius “r” and height “h”?

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What is the formula for the volume of a sphere with radius “r”?

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A9 Units.

What are 3 common units for length?

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What are 3 common units for area?

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What are 3 common units for volume?

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A10 Search the internet using keywords “dimensional analysis”. In your own words, what is dimensional analysis?

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Website URL:

What is the mathematical property that states 1\*A=A?

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Use dimensional analysis to convert 55 mph into feet per second in one long step.

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A11 Most countries use the metric system. Which countries do not?

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Website URL:

A12 Using dimensional analysis and only the following conversions between the metric system and the imperial system, convert the following.

1 inch = 2.54 cm 2.2 lbs = 1 kg 1.06 qt = 1 liter

A 200 pound man weighs how many kilograms?

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A car traveling 55 mph is traveling how many kilometers per hour?

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If your sink is leaking 1 cup per hour, how many liters per year is that?

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**PART B – TAXES**

B1 Go to <http://www.tax-rates.org/taxtables/sales-tax-by-state> and review.

Which state has the highest state sales tax and what is it?

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Several states do not impose a sales tax. Which ones?

>

B2 Go to <https://www.tripsavvy.com/arizona-sales-tax-rate-tables-2681004> and review.

What is the sales tax for Maricopa County?

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What city in Maricopa County has the highest sales tax and what is it?

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What is the combined total sales tax for Glendale?

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B3 In the “old days”, contractors charged sales tax on goods but not on labor. Now, contractors charge 65% of the tax on the entire job. Consider the following ways to calculate tax.

#1 Take 65% of the combined total sales tax for your city then multiply that by the entire job.

#2 Take 65% of the entire job then multiply by the combined total sales tax for your city.

Which way is correct? Or, are they both the same?

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Which mathematical property does this question deal with?

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**PART C – GARDEN OR POOL QUOTE/ESTIMATE**

Your group is going to design and provide a quote/estimate for either a memorial garden or pool to honor GCC veterans. It will be located on the Main campus and no demolition will be required. The college will provide electricity, water and sewer at the project (if needed). The garden or pool must cover a rectangular area at least 15’x30’ but not be bigger than a rectangular area of 25’x50’. The garden will be a raised bed with a height of 18” and the pool will be a depth of 18”. The garden or pool must have a circular element and a triangular element in the design. The more creative, the better.

C1 Go to <https://www.hloom.com/more/estimate-templates/> and review.

What is the difference between a job estimate and quote?

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What are 3 reasons you should provide a written estimate or quote?

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What should a job estimate include?

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In addition to the above, what should a job quote include?

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Review the templates and see if you like any of them. You are free to use these, find other ones or design your own.

C2 Prepare your estimate/quote.

Some of the many things to consider for the garden:

* border material (include perimeter figures in feet)
* soil material (include volume figures in cubic yards)
* watering system
* plants

Some of the many things to consider for the pool:

* perimeter (figures in feet)
* amount of concrete (assume thickness of 4” for walls and floor, include volume figures in cubic yards)
* volume of water (in gallons)
* cleaning system

C3 How can we pay for this? Students of course!

Research the web to determine how many students go to GCC?

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Website URL:

How much would each of them have to contribute to fund your project?

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Research the web to determine how much it costs per credit hour (exclude other fees) to attend a Maricopa Community College such as GCC.

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Website URL:

How many hours would we have to “sell”/teach to fund your project?

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**PART D – PROPOSAL**

D1 Your group will present the estimate/quote to the class. You will be competing against other groups. Everyone in your group must be involved with the presentation. Every group member should be able to answer questions about the estimate/quote from me or the class. Your presentation should be between 4 and 5 minutes.

D2 Save this Word document as groupname.measurement and email this and your estimate/quote to me.