**MIDDLE SCHOOL MATH PROJECTS**
**Summer 2018**

Here are three fun math projects for you to complete. If you are opting to do the projects rather than the summer math review packet, **you must complete all 3 of the projects**. Just as with the packet, this work is to be turned in during the first week of classes. We hope that you have some fun exploring the cost of attending college, estimating the cost of financing a car and completing the geometry puzzle named for Archimedes.

Name _____ Date _____

## Project #1: Estimating the TOTAL COST of *Attending College*

Estimate and compare the costs of each scenario. Use the Internet to find the necessary information.

You are in your junior year of high school. You are planning for college and know you want to graduate from a four-year university. Your parents have told you that you must limit your choices to public universities rather than considering private ones. They have asked you to put together a projected list of expenses for the school of your choice. You have quite a bit of thinking to do.

Your choices of four-year in-state public universities are as follows: Arizona State University (ASU), University of Arizona (UofA), and Northern Arizona University (NAU). Your choices for out-of-state public universities are endless.

You know that tuition is expensive, so you want to comparison shopping. To save money, you are considering the option of living at home for the first two years of college while attending a local community college and then transferring to a four-year university for the final two years. You are also considering the option of doing all four years at a four-year university. You are wondering how much more it would cost to go out of state rather than staying in state.

First, you need to do some research.

- Decide which of the four-year in-state universities you want to explore.

You are required to pick one of the following: ASU, UofA, NAU.

- Decide which out-of-state public university you want to explore.
- Fill-in the table below

### ESTIMATED ANNUAL COSTS & CONTRIBUTIONS

| | Pima Community College | In-state, 4-yr, public university: _____ | Out-of-state, 4-yr, public university: _____ |
|---|---|---|---|
| **Tuition & Fees** (annual) | | | |
| **Books** (annual estimated expense) | | | |
| **Room & Board** (annual housing expense) | | | |
| **Travel Expenses** **(Only for out-of-state: find the cost for 3 round-trip flights to the nearest city)** | | | |
| **Other Expenses** (Misc. Fees) | | | |

1. What is the estimated total **annual cost** of attending each college?

| | Total Annual Cost (Write an equation that shows your calculations) |
|---|---|
| Pima Community College | |
| 4-year In-State Public University | |
| 4-year Out-of-State Public Universtiy | |

2. How much would it cost to attend an in-state 4-year university for all four years?

3. How much would it cost to attend an out-of-state 4-year university for all four years?

4. What is the estimated cost of attending Pima Community College for the first two years, and then attending a four-year in-state university for the final two years?

5. What is the estimated cost of attending Pima Community College for the first two years, and then attending an out-of-state university for the final two years?

6. How much money would you save by attending Pima for 2-years and then going In-State for the last two years?

7. How much money would you save by attending Pima for 2-years and then going out-of-state for the last two years?

8. How much more would it cost to attend an out-of-state university for all four years when compared to attending an in-state 4-year university for all four years?

9. Which option would you choose and why?

Name _____ Date _____

**Project #2: PURCHASING A CAR:** *Calculating Down Payment, Interest & Total Cost*

Complete the table by calculating the down payments, interest and total cost of each car.

You are in your last year of college and have a part-time job. You decided to purchase your first car to be able to get to school and work faster. You have saved $2,150 to give as a down payment for a car, and finance the rest. You went car shopping and these are the cars you're interested in purchasing:

| | 11% DOWN PAYMENT | INTEREST RATE & TIME | INTEREST (after down payment) | TOTAL COST |
|---|---|---|---|---|
| Car#1 Honda Civic $19,500  | | 7 % Interest Rate<br>4 years | | |
| Car#2 BMW 325 $23,320  | | 6.7 % Interest Rate<br>5 years | | |
| Car#3 Nissan Altima $21,600  | | 5.4 % Interest Rate<br>5 years | | |
| Car#4 Chevrolet Malibu $18,250  | | 7.2 % Interest Rate<br>5 years | | |
| Car#5 Toyota Camry $22,230  | | 4.5 % Interest Rate<br>6 years | | |
| Car#6 Lancer Mitsubishi $17,180  | | 7.2 % Interest Rate<br>4 years | | |
| Car #7 VW Jetta $20,080  | | 5.3 % Interest Rate<br>4 years | | |

1. Which cars can you afford based on the down payment?

2. Which car has the highest monthly payment?

3. Which car has the lowest monthly payment?

4. What things should you consider before purchasing a car?

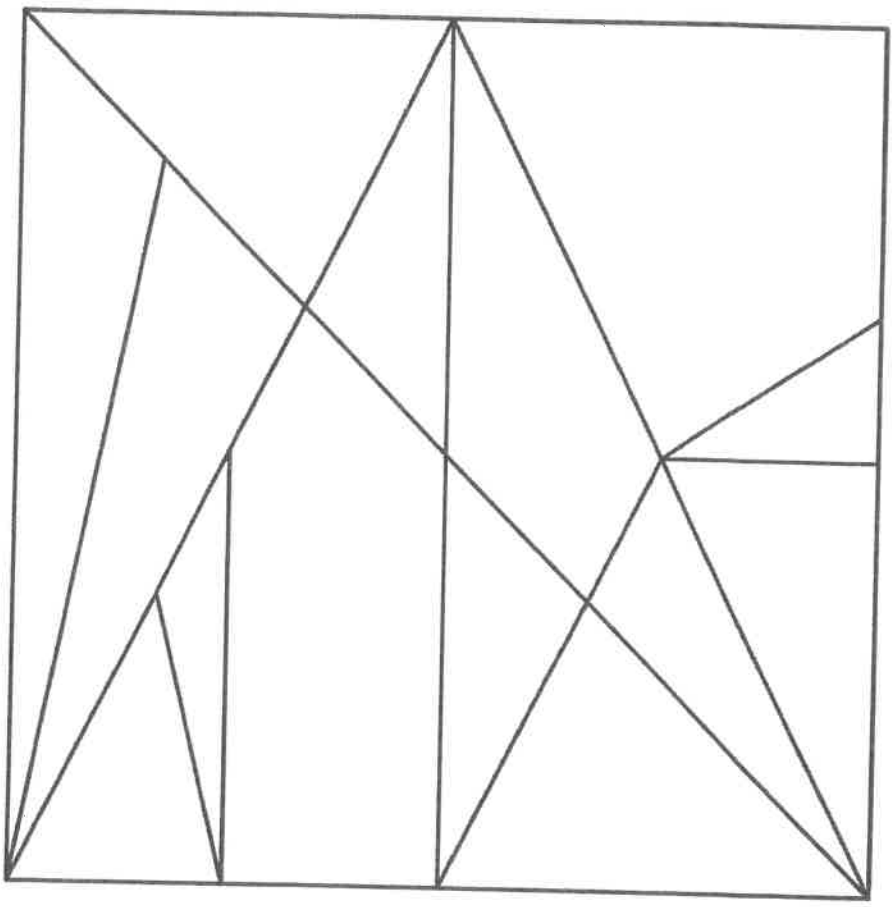
5. Which car would you buy based on price?

Name _____ Date _____

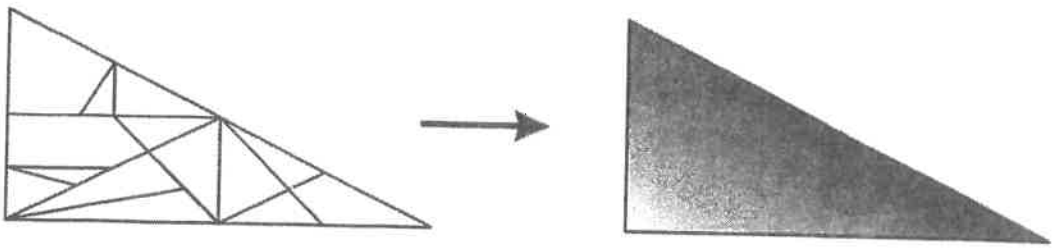
**Project #3: Archimedes' Puzzle**

The *Stomachion* is a puzzle that is at least 2,200 years old. It was known to the ancient Greeks. Some people think that it was created by the Greek scientist Archimedes, which is why it is sometimes called *Archimedes' Puzzle* or the *Loculus of Archimedes*.

The puzzle consists of 14 pieces of various shapes and sizes. These pieces are created by dividing a square as shown below. The object of the puzzle is to rearrange the pieces to form other shapes.

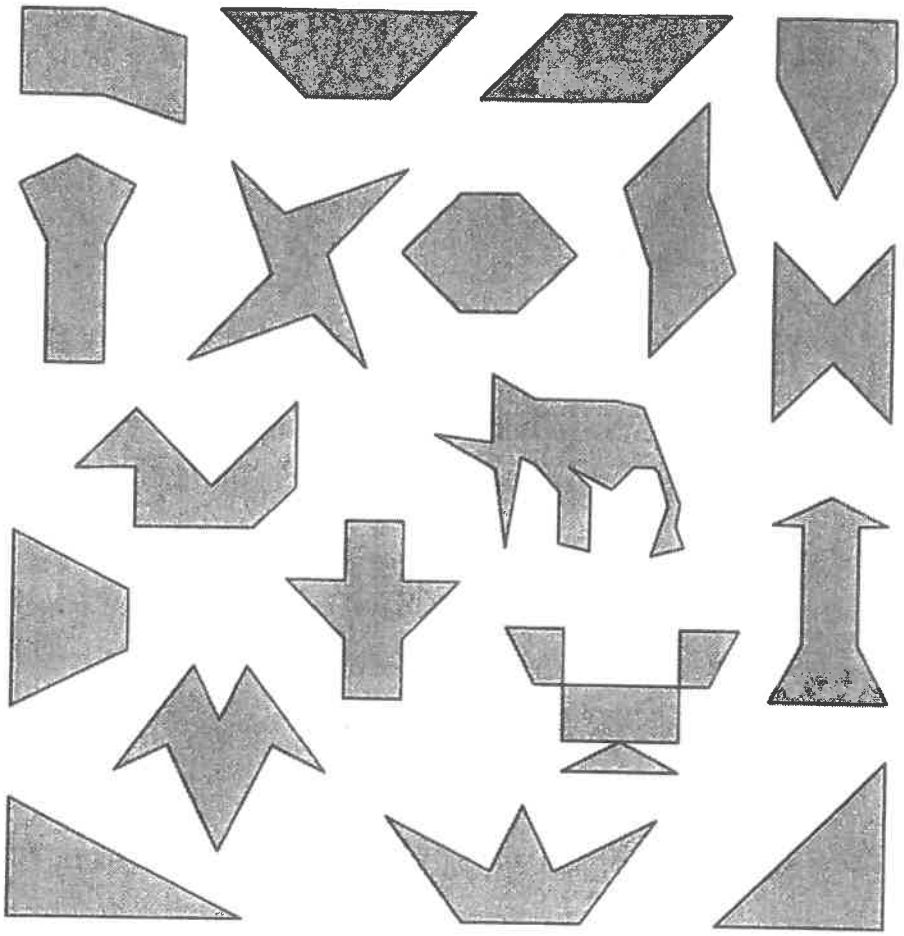


Cut out the pieces of the *Stomachion*. Then, rearrange the shapes to create the triangle shown below. The figure on the left shows how the pieces must be arranged to form the triangle.



After successfully making the triangle, glue the pieces to a paper and give it to your math teacher on the first day of school.

Here are some other shapes that can be made from the pieces of the *Stomachion*. How many can you create?



1. Which of the shapes above were most difficult to create? Which were easiest? Why are some shapes more difficult to create than others?

2. Which of the shapes above look the same when flipped?

3. Which of the shapes above look the same when rotated?

Choose one that you were successful with and glue that to a paper and give that to your math teacher along with the triangle.