College Algebra in the Big Real World

By: Math Department of ASUN
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Co-Presenter: Karen Young

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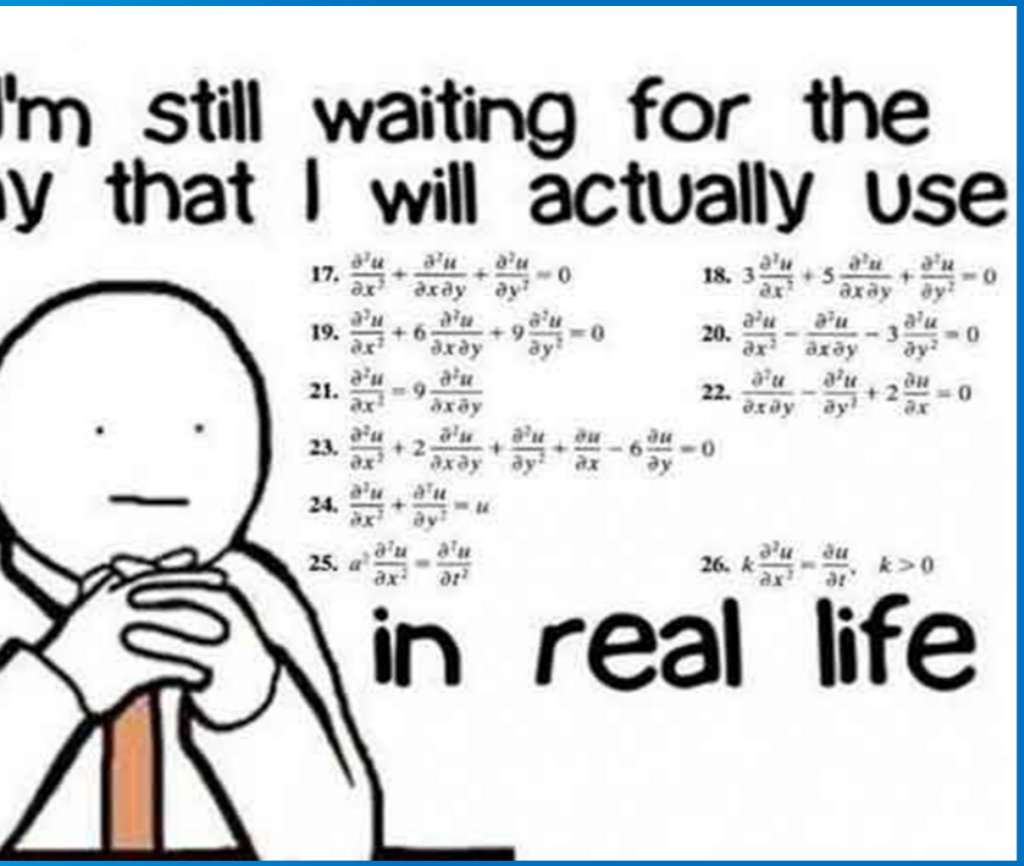
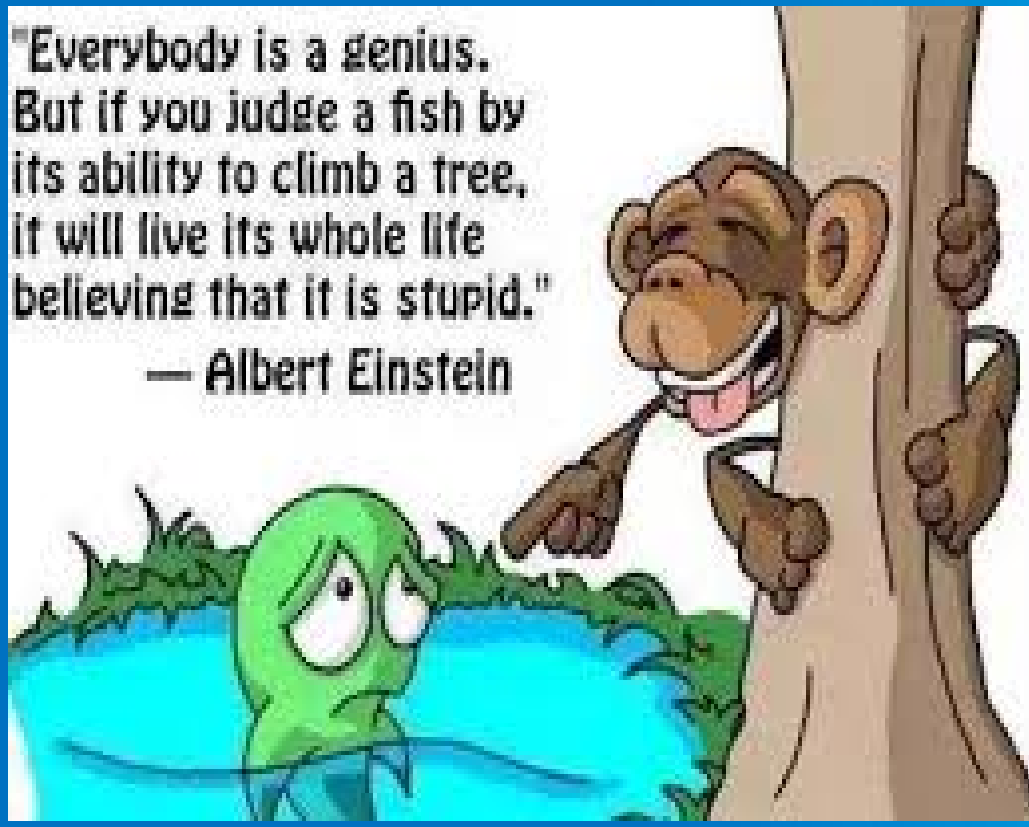
EVERYONE IS SMART IN THEIR OWN WAY!





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OBJECTIVES:

- Over coming the fear of Mathematics
- Teaching Styles
- When will we ever use College Algebra?
- Creative Ideas to bring College Algebra alive.
- Collaboration / Ideas

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FEAR OF COLLEGE ALGEBRA

- Large number of students are not graduating due to the fact they are unable to pass college algebra.
- Students believe that college algebra is to hard.
- College Algebra is overwhelming.

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OVER COMING THE FEAR

- Change in mindset.
- Bring the course alive.
- 20 – 30 minute lectures then in class activities.
- Peer tutoring/teaching.
- Project assignments.
- Class discussions.
- Encouragement.

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DISCUSSION ASSIGNMENT

ntroduction Discussion And

Critical Thinking Discussio

oduction Directions: In order to
eive full credit you must:

y to this discussion introducing yourself to the
ss.

re about yourself, your major, your plans for
future (where do you see yourself in 5
rs/10 years), family, children/pets, hobbies,
thing you would like to share. What would
like to gain from this course.

y to at least one of your classmates. To make
onnection to build the classroom community.

- **Critical Thinking Directions: In o**
to receive full credit you must:

1. reply to this discussion answering the
questions below in clear statement fo
2. must show your math work to suppor
your findings.
3. reply to at least one of your classmat
explaining why they like the way or d
like the way it was solved. One or two
word replies are not considered for c

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EXAMPLES OF A DISCUSSION ASSIGNMENT

Introduction Discussion

want to take this time to introduce myself to you. I am an ssistant Professor of Mathematics Mrs. Karen Young. I rew-up and still live in Corning, AR. I have been married o a farmer for 33 years and we have two adult children. A laughter Lesa who is married to Bryan Bass and they have ny only grandson Sylas. A son Keith, who is single. I also ave a fur-child named Rowdy, a Belgian Malinois, who is 2 ears old and he lives up to his name every day.

have a BS in Elementary Education, an MS in Education nd an MS in Mathematics. My daughter tells me I am a rofessional student, but I just love to learn. Most people ust tell me I am a NUT for getting the degree in athematics.

have taught math at the high school level for 13 years nd at the college level for 10 years. I taught for Black iver Technical College on the Paragould Campus for 2 nd a half years and worked as Math Tutor on the ocahontas Campus part time for a little over 1 year. I ave been an Adjunct Instructor of Mathematics for ASU-lewport since the fall of 2013 and was hired as an ssistant Professor in Mathematics in 2015.

am looking forward to this class and getting to know each nd every one of you.

Critical Thinking Discussion

- Skidding Car: The force needed to keep a car from skidding on a curve varies inversely as the radius r of the curve and jointly as the weight of the car and the square of the speed. It takes 300 lb of force to keep a 200 lb car from skidding on curve of radius 500 ft at 30 mph. What force will keep the same car from skidding on a curve of radius 800 ft at 60 mph?
- Loan Interest Rates: A realtor borrowed $90,000 t develop some property. He was able to borrow part of the money at 5.5% interest and the rest a 6%. The annual interest on the two loans amount to $5125. How much was borrowed at each rate?
- Solve the modeling problem. Cell Phone Charge A cell phone service provides communication between two cities. If x represents the number of minutes for the call, where x > 0 , then the functio f(x) = 0.75[x] + 1.50 gives the total cost of the call dollars. Find the cost of a 7.5-minute call.

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EXAMPLE OF IN CLASS ACTIVITY

Teach 20-30 minutes over quadratics and explaining the formula for projectile.

The remaining time in class the students create their own quadratic.

If you have access to a gym or field.

Will need to split the students up into groups of three or four.

Items need per group is 1-ball, 1 or 2 measuring device(s), 1-stop watch, pencil and paper.

One person will throw the ball.

One person will mark the initial height of the ball from where it is being released.

One person will use the stopwatch to mark the time the ball traveled.

One person will mark where the ball landed.

The students will solve for the speed of the ball and solve for the maximum height.

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EXAMPLE OF PROJECTS

- Budgets.
- The Game of Life.
- Creative Math Art.
- Creating their own home, water park, or business.
- Exponential Growth.
- Exponential Decay.
- Cane Toad

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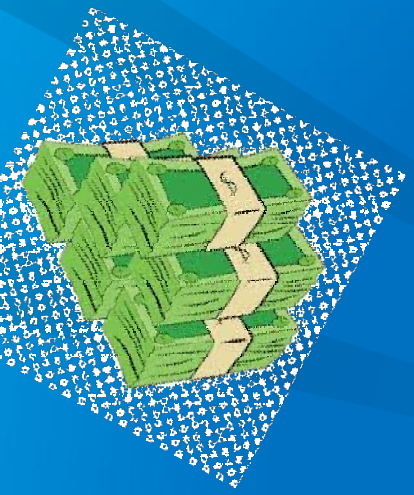

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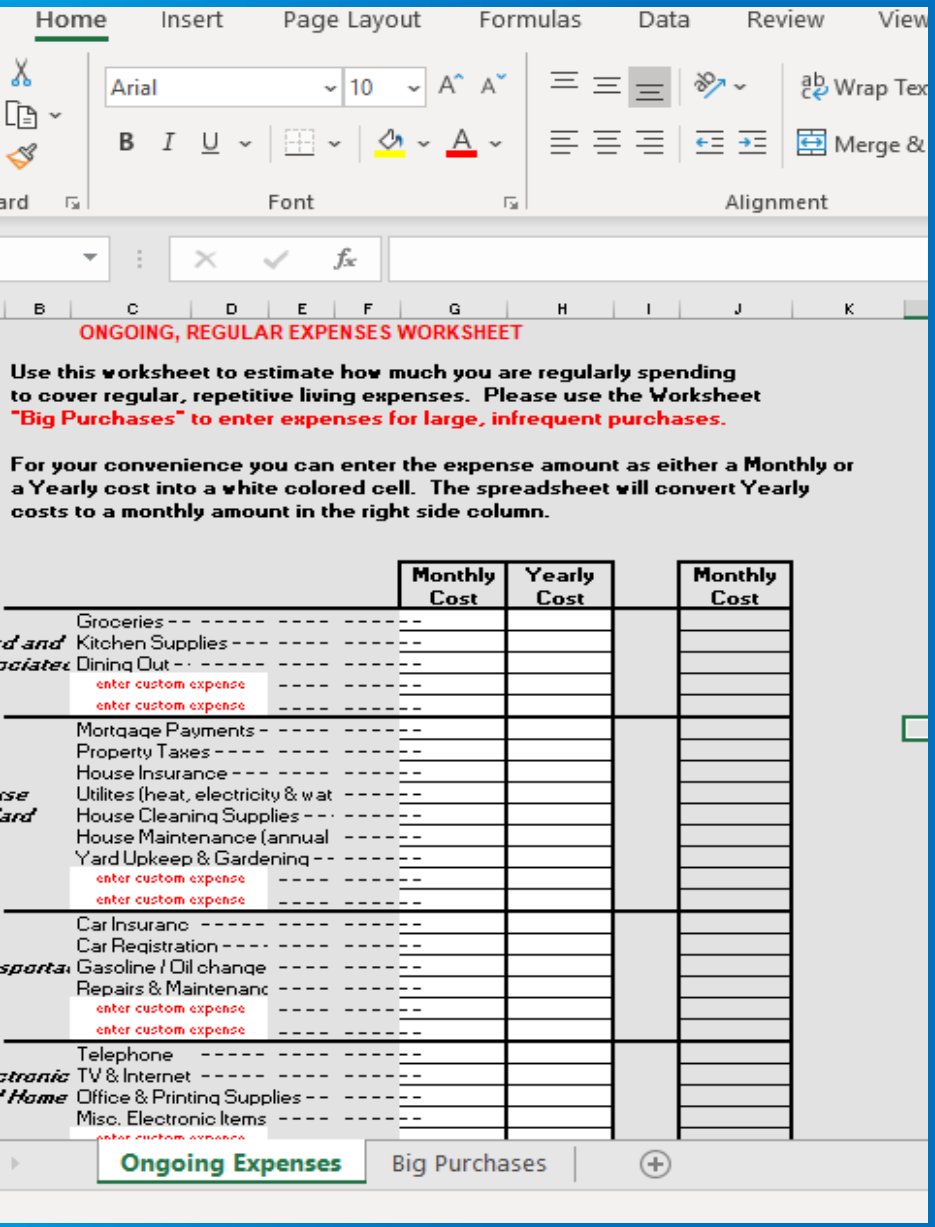


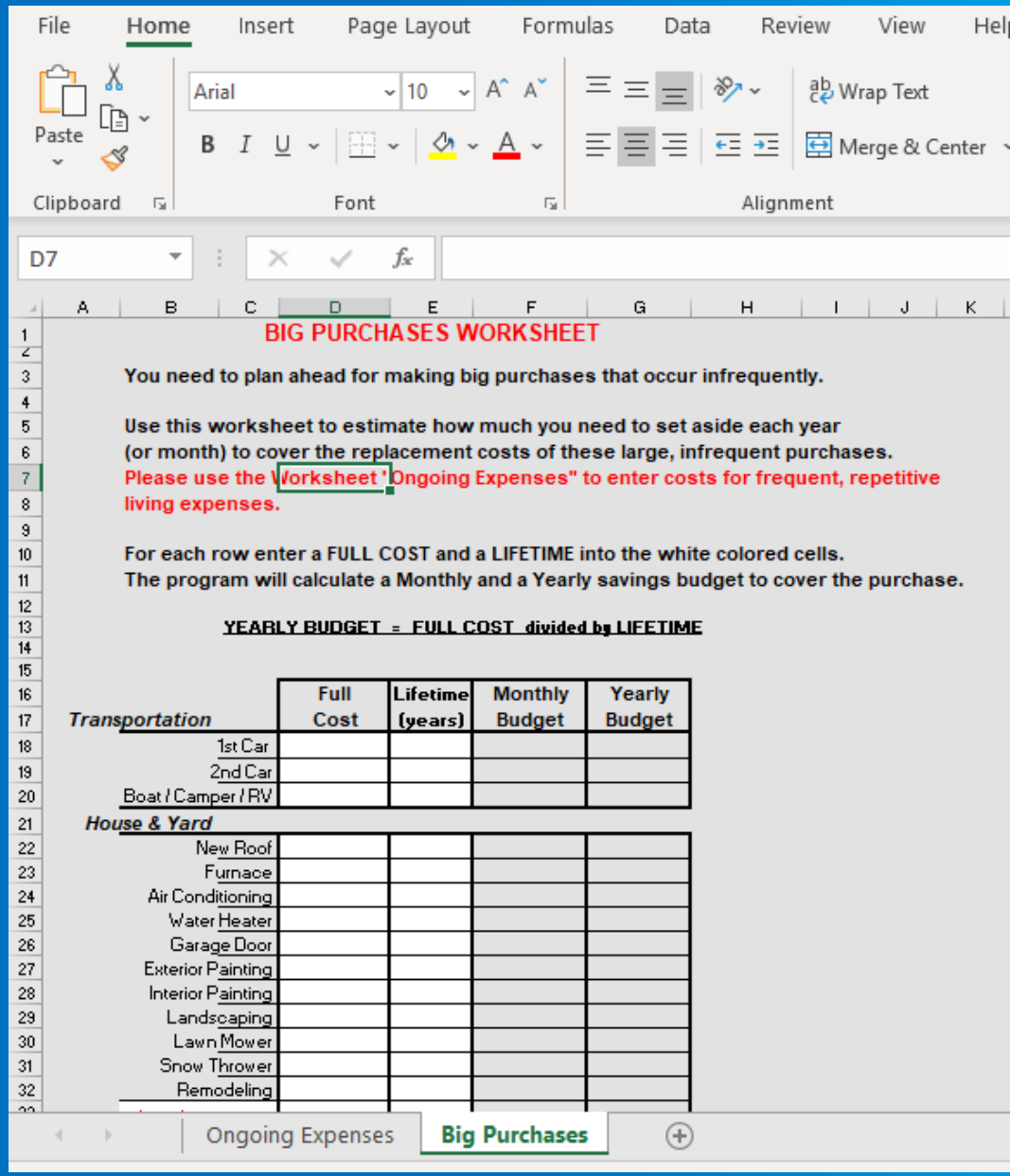
ONGOING, REGULAR EXPENSES WORKSHEET

Use this worksheet to estimate how much you are regularly spending to cover regular, repetitive living expenses. Please use the Worksheet "Big Purchases" to enter expenses for large, infrequent purchases.

For your convenience you can enter the expense amount as either a Monthly or a Yearly cost into a white colored cell. The spreadsheet will convert Yearly costs to a monthly amount in the right side column.

		Monthly Cost	Yearly Cost		Monthly Cost
	Groceries				
	Kitchen Supplies				
	Dining Out				
	enter custom expense				
	enter custom expense				
	Mortgage Payments				
	Property Taxes				
	House Insurance				
	Utilites (heat, electricity & wat				
	House Cleaning Supplies				
	House Maintenance (annual				
	Yard Upkeep & Gardening				
	enter custom expense				
	enter custom expense				
	Car Insuranc				
	Car Registration				
	Gasoline / Oil change				
	Repairs & Maintenanc				
	enter custom expense				
	enter custom expense				
	Telephone				
	TV & Internet				
	Office & Printing Supplies				
	Misc. Electronic Items				

Ongoing Expenses | Big Purchases



BIG PURCHASES WORKSHEET

You need to plan ahead for making big purchases that occur infrequently.

Use this worksheet to estimate how much you need to set aside each year (or month) to cover the replacement costs of these large, infrequent purchases.
Please use the Worksheet "Ongoing Expenses" to enter costs for frequent, repetitive living expenses.

For each row enter a FULL COST and a LIFETIME into the white colored cells.
The program will calculate a Monthly and a Yearly savings budget to cover the purchase.

YEARLY BUDGET = FULL COST divided by LIFETIME

	Full Cost	Lifetime (years)	Monthly Budget	Yearly Budget
Transportation				
1st Car				
2nd Car				
Boat / Camper / RV				
House & Yard				
New Roof				
Furnace				
Air Conditioning				
Water Heater				
Garage Door				
Exterior Painting				
Interior Painting				
Landscaping				
Lawn Mower				
Snow Thrower				
Remodeling				

Ongoing Expenses | Big Purchases

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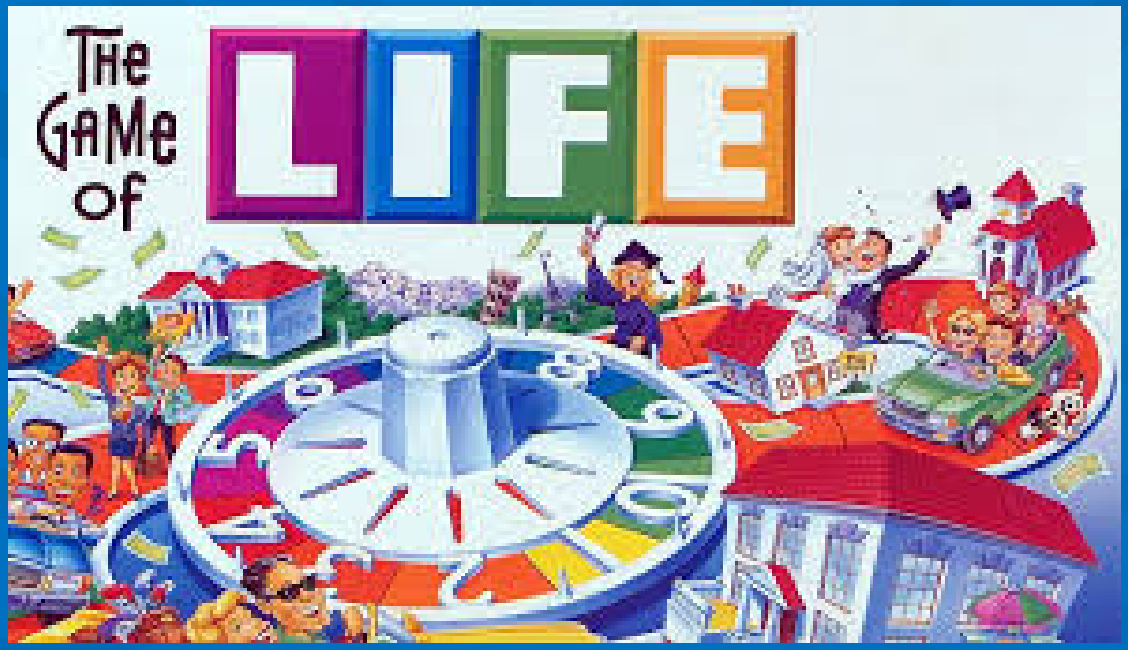
Game of Lilfe



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YOU

HIGH SCHOOL TO COLLEGE – Non-Traditional
WORK TO COLLEGE - Traditional

re your **GOALS** and **PLANS?**

s your **FAMILY SIZE** now or future family?

u have a **SPOUSE**?

u a **DEPENDENT**? If so, how much do you cost your care takers?

u have **DEPENDENT(S)**?

ME:

Annually Income from Career or Careers after taxes, social security, insurance
Benefits from Career or Careers

CLE:

Do you own or have payments or rent?
Insurance
Taxes

IENTS FOR HOME:

_____ borrowed _____ from his/her bank/
He/She agrees to repay back _____ with a simple annual interest
How much will the interest amount to?
What amount must you pay back at the end of the _____?

Layout References Mailings Review View Help Search

RENT A HOME OR APARTMENT:

_____ rent apartment/house at _____per_____
payment you may be charged a late fee of _____. The contract that
_____.

a) How much will the larger charges add up to if you are late three time
b) What will be the total amount that you will have paid at the end of y

MONTHLY LIVING EXPENSES

a) How much annually is spent for food?
   What is the percentage of the income spent on the food?
b) How much annually is spent for household supplies?
   What is the percentage of the income spent on household supplies?

TRAVEL EXPENSES – Use the Project – Chapter 2 to calculate

a) How much annually is spent for gas for work/school?
   What is the percentage of the income spent on gas?
b) How much annually is spent for gas travel for dependents day care/v

DEPENDENTS MONTHLY EXPENSES

a) How much annually is spent for food dependents consume?
b) How much annually is spent for dependents household supplies?

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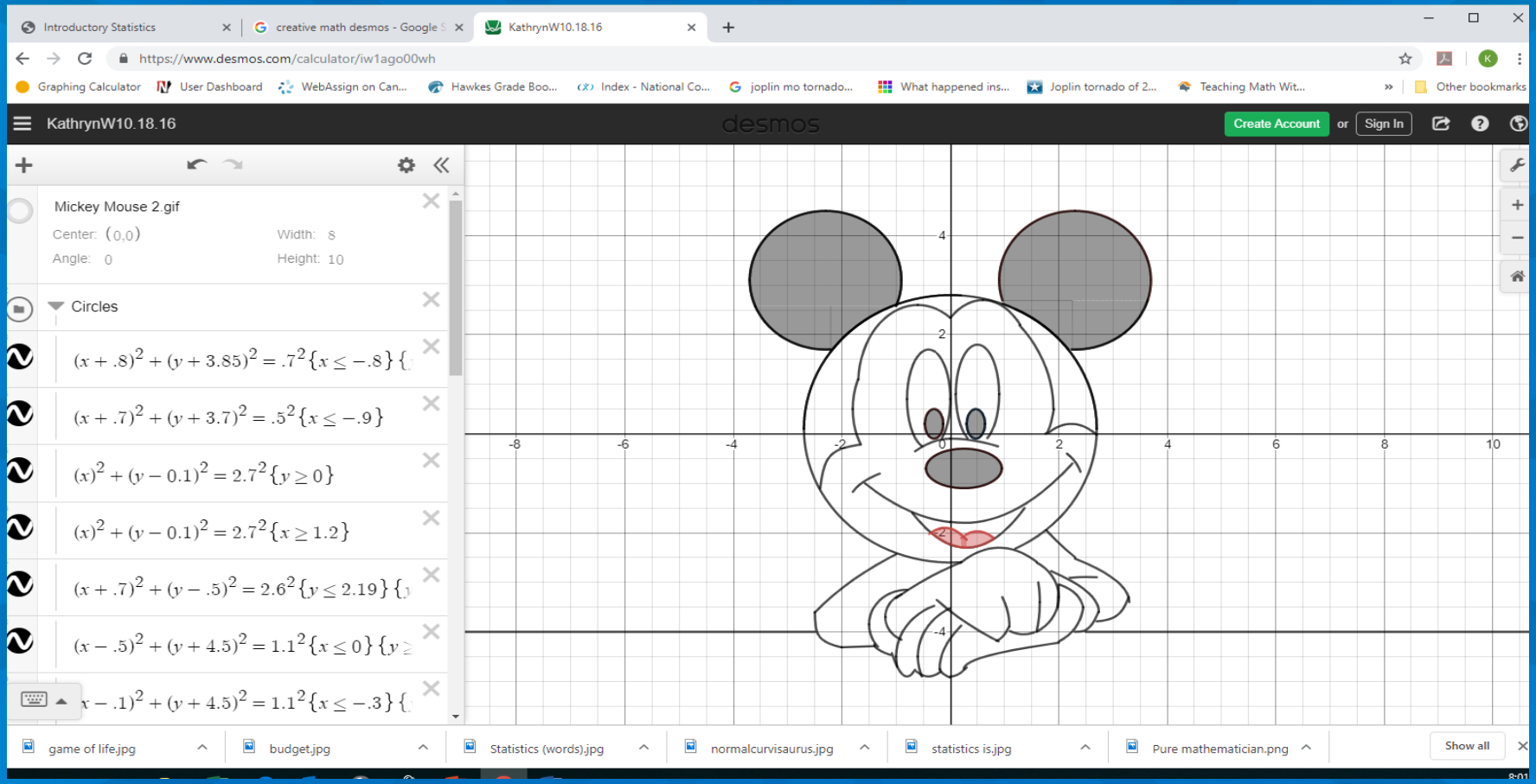
Creative Math Art



https://www.desmos.com/

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Chapter 2 Project
Algebra Project Worth 130 points
NO LATE PROJECTS ACCEPTED

Goal: You will be creating an original piece of artwork using line segments, circles and triangles. Your artwork will provide the basis for understanding slope, slope-intercept, circles, and graphing.

Step 1: Set – up On a sheet of graph paper you will need to create a coordinate plane as large as the paper and including all four quadrants. Label your axis and place numbers on your number lines. Brainstorm some ideas of pictures that you could draw that would have plenty of variety using line segments and circles.

Step 2: Details Your picture will need a total of 15 line segments writing linear equations ($y = mx + b$) for each line segment. Six line segments should be horizontal or vertical ($x = \#$ or $y = \#$). The remaining nine line segments should be diagonal be sure to use parallel and perpendicular lines as well as other lines. Your drawing must have at least 15 line segments, however, you may use as many lines as you need. Only 15 need to have equations written for them. Your drawing must have at least two circles, however, you may use as many as you need. Only two need equations written for them, using Center-Radius Form ($(x - h)^2 + (y - k)^2 = r^2$). Use at least one right triangle and prove that it is a right triangle using the vertices (from section 2.1). The right triangle cannot be comprised of horizontal and vertical lines (you must use diagonal lines). Show all the work that you completed to determine the equations for each of the 15 lines, two circles, and the one right triangle.

Step 3: Drawing Draw a picture and label each of the 15 line segments as L1, L2, L3, …, L15, label the circles as C1 and C2 so that each can be easily identified. Make sure your picture is colored, neat, and has a title.

Step 4: Equations On a separate sheet of paper write the equations of the 15 line segments, two circles, and proof that the right triangle is indeed a right triangle. (1) Label each equations as it corresponds to the line segments and circles. (2) Write the equations of the line segments in slope – intercept form and the equations for the circles in center-radius form. (3) Prove that the right triangle is in fact a right triangle. **Note:** All equations for the line segments and circles must include the steps taken to find the equation. Such as give the coordinates of each point, finding the slope, and writing the equations using the point-slope form and ending in slope-intercept form. Same for the circles. Proving that the right triangle is a right triangle must include the coordinates of each vertex, find the length of each side using the distance formula, and show that the sum of the square of two sides equals the square of the third side ($a^2 + b^2 = c^2$).

Step 5: Cover Page On a separate sheet (Cover sheet) of paper print your name, date, title of drawing, course

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Creating their Own Water Park

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Water Park Project Part 1

TASK 1: Designing your Park

You have recently been hired to create a blueprint for a water park. Your boss, Gelatinous Harrington, is a very controlling person. She wants you to include specific attractions and necessities in your design. Be prepared to answer her questions before you have had enough time to adequately explain what you are doing. First off, she wants it to be done on a large sheet of graph paper so that she can apply her mathematical knowledge to make the park the best it can be. She has issues and will yell at you if you do not do this properly. Before starting your blueprint, identify the center of your paper, and use a ruler to draw in the x and y axes. Then, you need to plot the approximate entrance points (where the line starts!) of each attraction on the graph paper and draw in the remaining part of the attraction around it in a creative fashion. Try to spread them out as much as possible. Use a pencil to draw the items and then go back and color them in with colored pencils.

Items to be included on the design are listed below:

-Help center
-Large whirlpool
-3 different water slides (use your imagination)
-Toddler area
-Lazy river
-Concessions
-Gift shop
-Restrooms
-Security desk

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Exponential Growth

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Shepard's
BackCountry Guide Service

To: Area Consultants

From: Mrs. Karen Young
Area Manager, Shepard's BackCountry Guide Service
Jameson Township, Colorado

Date: April 27, 2018

Re: Elk Herd Study

In 2005 we introduced a small herd of (30) Elk into a 4500-acre fenced area that contains two small stream fed lakes, three 20-acre feed plot areas and other minor features. The fenced area is suitable habitat for the herd. According to our records we had the following number of Elk

Year	Number of Elk
2005	30
2007	39
2010	57
2012	73
2015	107
2017	133

To be able to plan for future needs we need some basic information.

1. What is the growth rate of the Elk herd?
2. What will the population be in 10, 20 and 25 years?
3. What recommendations/concerns do you foresee with this herd?

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Exponential Decay

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A group of scientists have discovered a box of elements placed in a safe environment by Marie Curie. These elements were found to be radioactive. These elements were discovered and placed in the safe environment in 1915. Before they were sealed up each was thoroughly documented and placed into the vault with the elements. Here is the need information to help with the model building for each one.

Element	Stored (weight)	Weight today
Dotium	500 g	333 g
Noahium	500 g	375 g
Olivium	500 g	350 g
Gwenium	500 g	280 g

Use the example to help you build a model for each element and predict how much will be left of the element in the year 2500. Write a note and tell the person who will open the vault how much of each of the elements should be expected. Be sure to include items about how you arrived at the amounts you say.

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CANE TOAD

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ants lead Australia's charge a
cane toads

enlist insects in latest attempt at biological
ent of country's numerous eco-system disaste

: Cane toads meet their match
at eating ants tackle cane toad

in Sydney
Friday 3 April 2009 10.09 EDT

long been the scourge of household pets in Australia. Photograph: Bob Elsdale/Ge

oman who swallowed the spider to catch the fly, Australian sc
tive meat ant will eat the cane toad, that was sent to swallow t
gar cane crop.

ugliness and feared because of its unstoppable invasion of th
e cane toad consistently rates as the most despised exotic pest

Cane Toad Project
Exponential Growth and Decay

1. Read Cane Toad Article at http://www.guardian.co.uk/world/2009/apr/03/cane-toad-cull-australia/print

2. Watch the you tube video on Cane Toads.
http://www.youtube.com/watch?v=e8xPdj3UBSo

3. Write brief summary that proves understanding of the challenges Australi the Cane toad population. Use page 4 or attach. **(20 Points)**

4. Given the data below, find the rate at which the population is growing has since 1935. Show Calculation **(5 Points)**

Growth Factor = _____

5. Extend the growth trend to show the Cane Toad population in the 6th, 7th, Show all calculations **(10 Points)**

Years since 1935	Calculation	Toad Populatio
0		100
1		114
2		130
3		148
4		169
5		192
6		

9. The poisonous Cane Toad has dramatically affecte
As the Cane Toad population boomed, crocodiles
frequently, and when successful, the crocodiles die
poison.

The crocodile population in 1980 was 100,000 and

Write your formula to find crocodile population si

Discuss the environmental issues caused by the Ca
predictions can you make based on your da

Back up your prediction with relevant calculations

Why might an environmentalist or a politician be i
(Insert data into the chart below use page 4 or atta
(25 Points)

Year	Calculations
1980	

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Question?????

If you would like a copy of our resources please see one of us after questions.

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