

An **A.P.P.** (**A**ttendee **P**articipation **P**acket) for Advanced Algebra with Financial Applications: An Alternative 3rd or 4th Year Math Course for Struggling Students (Grades 10-12)

NEW Seminar Presented by Robert Gerver

Presidential Awardee for Excellence in Mathematics Teaching

Specifically Designed for all Mathematics Teachers, Mathematics Chairs, Math Interventionists, and Administrators Working with Students in Grades 10-12

- **An alternative, advanced algebra-based full-year course option** for struggling students who may not be mathematically ready for Algebra 2 and/or precalculus
- **Effective ways to incorporate** algebra, geometry, trigonometry, graphing, probability, and statistics into units driven by financial concepts
- **How to strengthen skills and self-confidence** to increase the mathematical readiness, skill set, and mindset needed for tackling current and future math courses
- **A comprehensive classroom-tested curriculum** designed to motivate, engage, and raise the bar for struggling math students



"Breakouts" 1-9.....Pages 1-8
"All Together Now" 1-7.....Pages 9-14

Break Out #1:

Finance Warm-Up

What is the largest amount of money you could have, in coins, and not be able to make change for a dollar?

Break Out #2:

Popular first topics are automobiles, stocks, and discretionary expenses—things kids buy.

What might be your favorite pick for the first topic? Why?

Which is the first one you'd leave out if time was an issue?

- **Discretionary Expenses**
- **Banking**
- **Credit**
- **Owning an Automobile**
- **Employment Basics/Income Taxes**
- **Independent Living**
- **Investing/Starting Your Own Business**
- **Budgeting/Retirement Planning**

Breakout #3:

Exchange ideas on these questions:

- *What graphing/calculator software are your students currently using?*
- *How do you display screens when teaching?*
- *What are you most comfortable with?*
- *Are you looking to make changes?*
- *Is the technology choice a departmental or personal decision for your own classes?*

Break Out #4:

Finance Warm-Up

- Three people pay \$10 each (total \$30) to check into a hotel.
- The manager realizes that they were overcharged and gives \$5 to the bellboy to return to the three people.
- The bellboy decides to return \$1 to each of the three people and keeps \$2 for himself.
- The three people each paid \$9 for their room, for a total of \$27.
- The bellboy received \$2. The three people originally paid a total of \$30. What happened to the other dollar?

Breakout #5:



The four prices add to 7.11 and they multiply to 7.11.

Two of the prices are \$3.16 and \$1.25.

Find the other two prices using Algebra 1 skills.

Breakout #7:

*Have you ever assigned projects in your math classes?
Which projects below intrigue you the most? (There are dozens more projects—this is a sampler.)*

PROJECTS ARE WORTHWHILE ALTERNATIVE ASSESSMENTS AND EXTRA CREDIT OPTIONS

- Price your own funeral
- Price a new car
- Price auto insurance
- Interview a banker
- Comparison shop loans
- Build a clinometer
- Interview a pharmacist
- Price a wedding
- Interview a stock broker
- Create a home inventory
- Interview a stockbroker
- Research failed inventions
- Price and plan a road trip
- Research patents and trademarks
- Comparison shop supermarkets
- Compare national vs. store brand items
- Price banking services
- Research FICO scores
- Interview insurance agent
- Price car leasing
- Research unemployment insurance
- Price a home closing for a house you pick
- Interview property tax assessor
- Research failed inventions
- Compare generic vs. name brand drugs

Breakout #8:

Justin is doing a statistical analysis to check if sports cars in his town are involved in more accidents than other types of cars. He polls 315 randomly selected parents of students in his high school and gets the results shown in the table below.

	Sports Car (S)	Sedan (SD)	Sport Utility Vehicle (SUV)	Total
Had an accident (A)	50	69	31	150
Never had an accident (N)	55	45	65	165
Total	105	114	96	315

Do sports cars get into more accidents than all cars in general?
Do sports cars get into more accidents than non-sports cars?

Breakout #9:

What is the APR for this payday loan?

- *I = interest,*
- *P = principal,*
- *R = annual interest rate expressed as a decimal*
- **THE LOAN INTEREST I is $\$20 + \$20 = \$40$.**
- **THE LOAN AMOUNT P is $\$200$.**
- **THE LOAN LENGTH T is 14 DAYS, which is $14/365$ of a year.**
- **USE THE SIMPLE INTEREST FORMULA $I = PRT$ AND SOLVE FOR R**

$$\text{Payday APR} = \frac{\text{Loan Interest}}{\text{Loan Amount}} \div \frac{\text{Loan Length in days}}{365} \times 100$$

All Together Now #1:

Live on the Document Camera: Credit Card Number

What digit would d have to be for the following number to be a legitimate credit card number?

3797 3263 1120 179 d

x2		x2		x2		x2		x2		x2		x2		x2	
3	7	9	7	3	2	6	3	1	1	2	0	1	7	9	d
															d

All Together Now #2:

Live on the Document Camera: Counterintuition

On her birthday, Helene, a mathematics teacher, bought a jacket at Loehmann's, a store that gives customers 10% off on their birthday.

- The jacket was discounted 25% for a holiday sale.
- The cashier first took off 10% off the original price, and then took off 25% off the reduced price. Helene requested that the store first take off the 25%, then the 10%, since she felt she wanted 25% off the larger amount.
- Which arrangement gives her the lowest price?

All Together Now #3:
Live on the Document Camera: Always/Sometimes/Never

- An auto insurance premium is A/S/N paid semi-annually.
- The mean of a distribution is A/S/N equal to the median.
- It is A/S/N necessary to purchase bodily-injury liability insurance if you insure a car in New York State.
- Your collision insurance will A/S/N cover the damage to a car you hit.

All Together Now #4: Live on the Document Camera: The Average Daily Balance

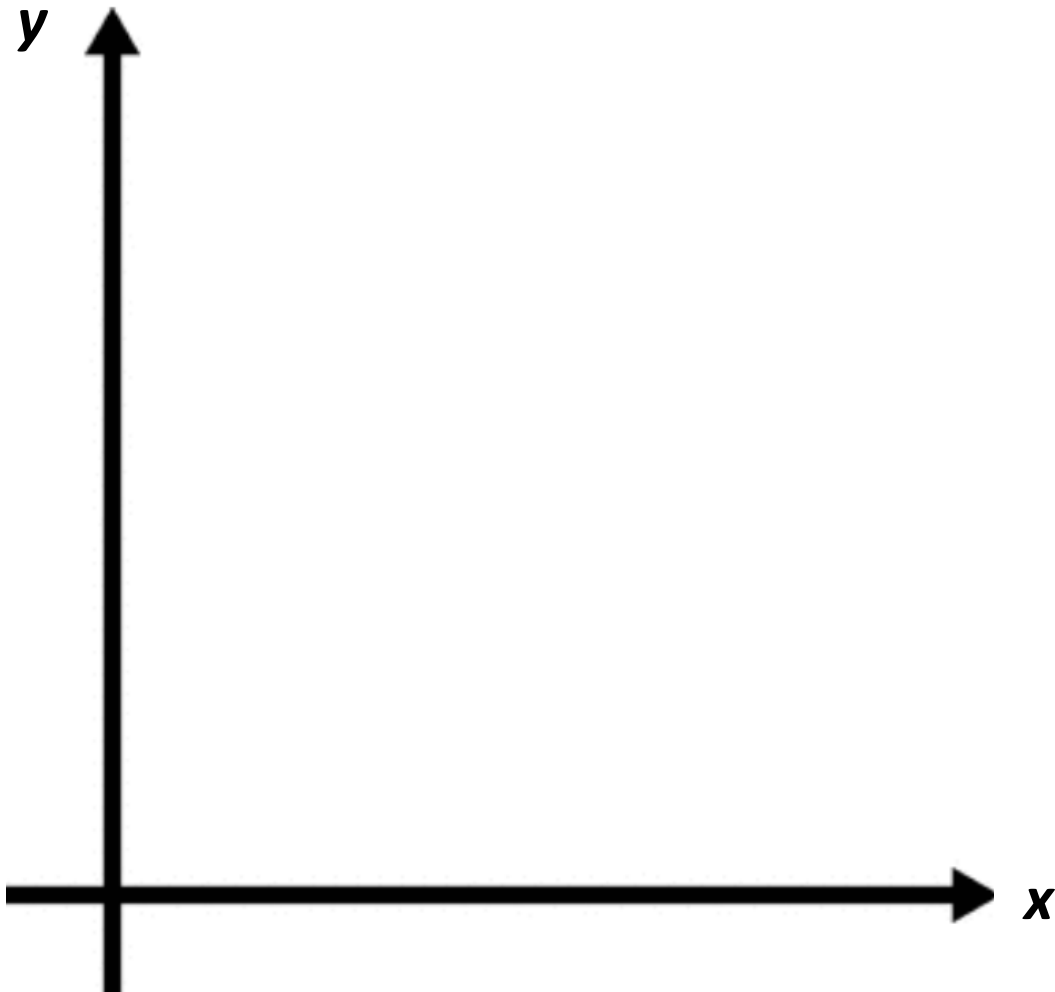
Elena Kaye				44 Central Avenue Onesburg, TX			
ACCOUNT INFORMATION							
Account Number		07-3458-1299		Billing Date		13 Nov	
				Payment Due		5 Dec	
TRANSACTIONS						DEBITS / CREDITS (-)	
25 Oct	House Depot					\$67.00	
29 Oct	Bubble Wrap Shipping Co.					\$55.00	
5 Nov	Payment					-\$160.00	
SUMMARY	Previous Balance	Payments / Credits	New Purchases	Late Charge	Finance Charge	New Balance	Minimum Payment
	\$829.30	-\$160.00	\$122.00	\$0.00	\$12.09	\$803.39	\$59.00
Total Credit Line				\$ 3,000.00		Average Daily Balance	
Total Available Credit				\$ 2,196.61		# Days in Billing Cycle	
				854.46		31	
				APR		16.98%	
				Monthly Periodic Rate		1.415%	

All Together Now #5:

Live on the Document Camera: The Social Security Function

In 2024, the government will take out 6.2% of your income, but only up until you have earned \$168,600. Then you are done for the year.

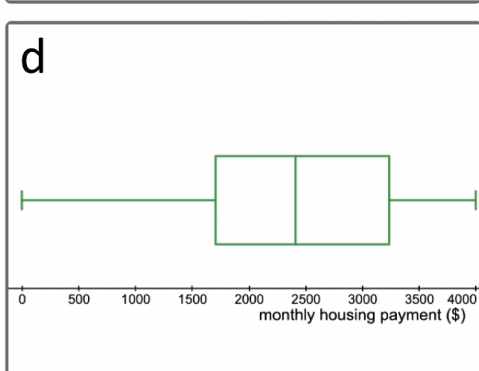
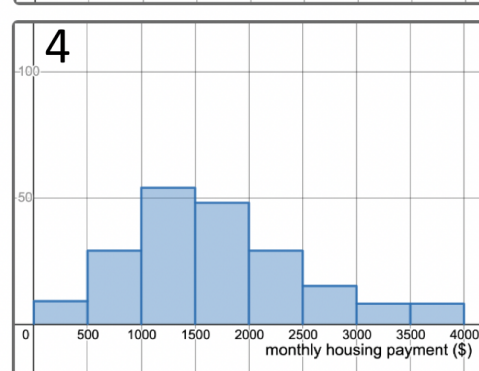
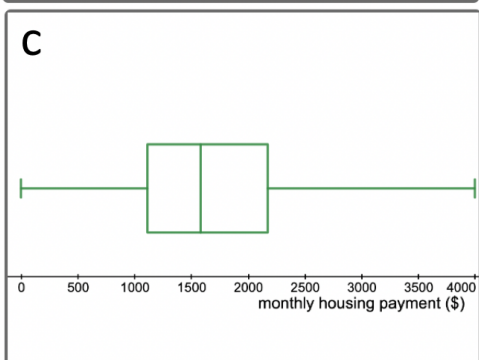
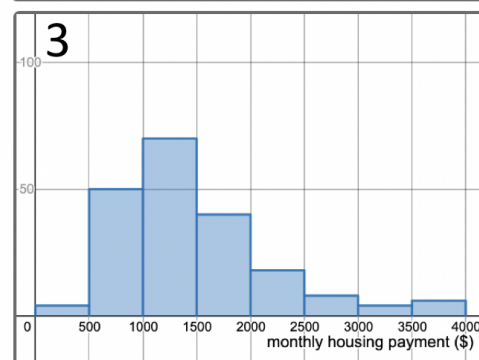
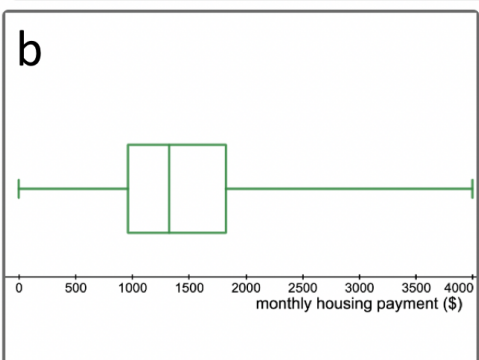
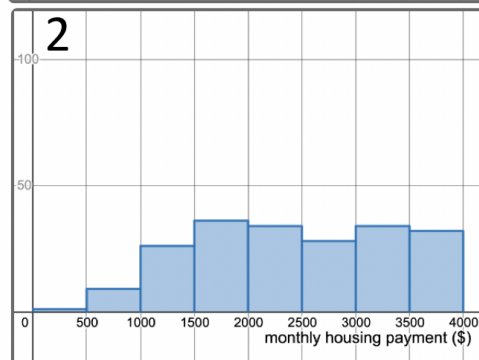
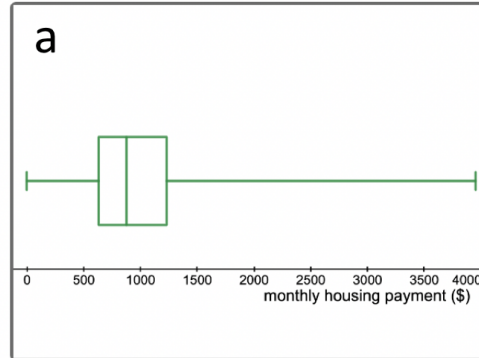
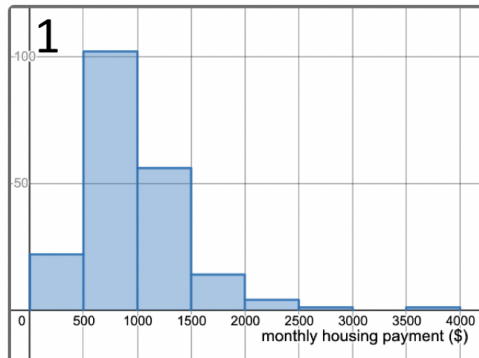
Express the 2024 Social Security function as a piecewise function and sketch its graph.



All Together Now #6:

Live on the Document Camera: NGPF Worksheet

Match the histogram with the boxplot for this survey of 200 people.
A good hint is, "Examine the median of each." Would you give this hint or let the students try it first with no hints?



All Together Now #7: Live on the Document Camera: Expected Value

EXPECTED VALUE AND LIFE INSURANCE

How do life insurance companies make profit from term insurance policies?

Financial Algebra Page 638--Examples 5 and 6

The Umbrella State Insurance Company sells a 5-year term insurance policy with face value of \$150,000 to a 41-year-old man for an annual premium of \$648. What is the profit the company receives from selling this policy for each age at death?

If the company sold 10,000 of the same policies, what would their expected profit be for the 10,000 policies?

Age at death	41	42	43	44	45	Age \geq 46
Profit at end of each year						
Mortality rate	0.0026	0.0029	0.0031	0.0034	0.0037	0.9843