

## Spreadsheets 4

### Lecture Set 15



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## Amortization Schedules

- Amortization schedule (table)
  - Incrementally shows how a debt is paid down
- Given  $P$ ,  $r$ ,  $n$ , and  $R$ 
  - We take the beginning balance at each time period
  - Multiply by the fractional interest due ( $r/n$ )
    - This gives us the interest due that period (e.g., month)
  - Recall that  $R$  is a combination of principal and interest for the period
    - So the amount of  $R$  that is used to pay down the balance is  $R - \text{interest due this period}$
  - Take that principal, subtract from the beginning balance, and that becomes the beginning balance for the next time period
- Easy to build a spreadsheet holding the entire table



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## Remember the Relationships

- Monthly Interest is beginning balance \*  $r/n$
- Principal is Payment – Interest
- End Balance is beginning - Principal

	A	B	C	D	E	F
1	Rate	6%				
2	Payment	\$899.33				
3	Principal	\$150,000				
4	Month	Beg. Balance	Payment	Interest	Principal	End Balance
5	1	\$150,000.00	\$899.33	\$750.00	\$149.33	\$149,850.67
6	2	\$149,850.67	\$899.33	\$749.25	\$150.08	\$149,700.59
7	3	\$149,700.59	\$899.33	\$748.50	\$150.83	\$149,549.77
8	4	\$149,549.77	\$899.33	\$747.75	\$151.58	\$149,398.19



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## Copy & Paste

1. Set formulas in first row
  - Make sure to "lock" references to any cells outside the table (e.g., interest rate, payment)
    - These might come from a different set of cells where you calculate the payment of a loan – possibly on a different sheet
  - Another way to "lock" a reference is to give a cell a name and then refer to that name in your formula
    - Name B1 "rate" and B2 "payment" and use those names in formulas
2. Set up relationship between first and second rows
3. Copy second row
4. Select 358 ( $n \times t - 2$ ) more rows and paste!
5. Plug in numbers
  - $P$ ,  $r$ ,  $R$
  - Table fills out!



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## What Table Tells You

- At any point you can see
  - How much you owe
  - How much of your payment is going to pay off interest and how much to pay down principal
- Could also add additional columns
  - "Running" Totals
    - Total Interest paid so far
    - Total Principal paid so far



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## Introducing Graphics

- Spreadsheets have powerful graphing capabilities
  - Can draw pie-charts
    - Select Principal or Interest from a Loan or Savings
      - Insert/Chart to create a pie-chart
  - Can draw line-graphs to show trends
    - Select columns
      - Beginning balance column from amortization table
        - » Show how loan balance drops
      - Principal and interest from amortization table
        - » Show how principal rises and interest drops for each payment over the life of the loan
    - Insert/Chart and choose a line-chart
- More on graphics later...



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