

# Introduction to Spreadsheets I



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and  
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The screenshot displays several overlapping Excel windows. The top window shows a data table with columns for months and years, and rows for different categories. Below it, another window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A third window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A fourth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A fifth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A sixth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A seventh window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. An eighth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A ninth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A tenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A eleventh window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twelfth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A thirteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A fourteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A fifteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A sixteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A seventeenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. An eighteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A nineteenth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twentieth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-first window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-second window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-third window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-fourth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-fifth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-sixth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-seventh window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-eighth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A twenty-ninth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A thirtieth window shows a table with columns for 'Year' and 'Month', and rows for various months from 1976 to 1979. A thirtieth window shows a line graph titled 'Hamilton County, Kansas - All Wheat' with a y-axis labeled 'Yielded in bushels per acre' and an x-axis labeled 'Year' from 1964 to 2004. The graph shows a series of blue dots representing actual data points and a red line representing a linear trendline. The legend indicates 'Actual (n=41)', 'Linear (R^2 11.6)', and 'Non-linear (R^2 8.7)'. The data points show a general upward trend from approximately 15 bushels per acre in 1964 to about 45 bushels per acre in 2004.

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## Types of software applications

- Word processor
- Spreadsheet
- Presentations
- Database
- Publishing
- Accounting
- Communications
- Statistical/numerical
- GIS
- Adobe acrobat (PDF)
- Other



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***It is important to have the right software/tool for the job at hand...***

***... however, the capabilities of many software programs often overlap, so it generally will not be necessary to have every type of software program.***



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***Spreadsheets – the world runs on spreadsheets!***

**Major spreadsheets available**

- Excel (Microsoft)
- Lotus (IBM)
- Quattro Pro (Corel)

**All three have similar capabilities and are “reasonably” compatible.**



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## ***Spreadsheets***

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**Replace calculator/worksheet**

**Example –**

**K-State 2002 Farm Bill evaluator**

- paper worksheet
- Excel spreadsheet



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## ***Spreadsheets***

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**Replace calculator/worksheets**

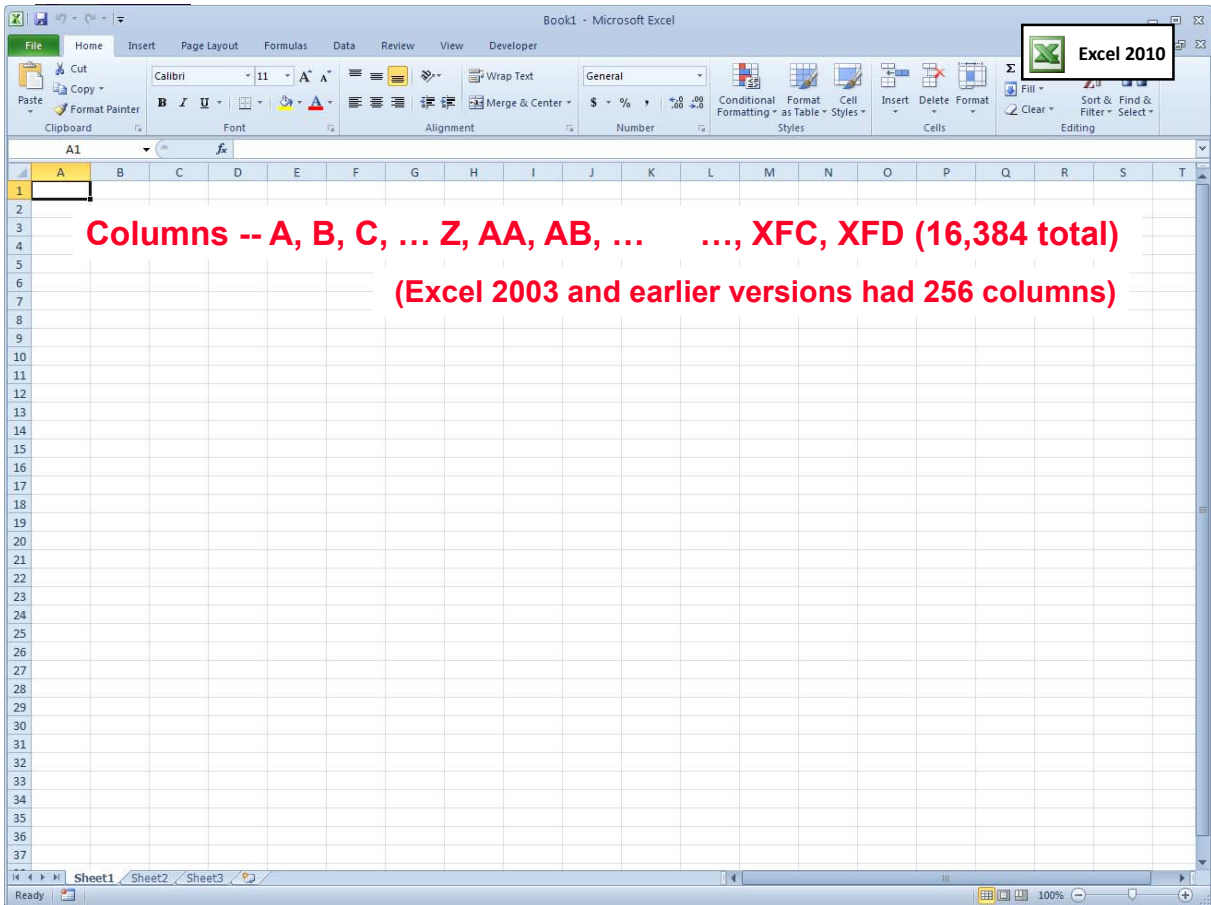
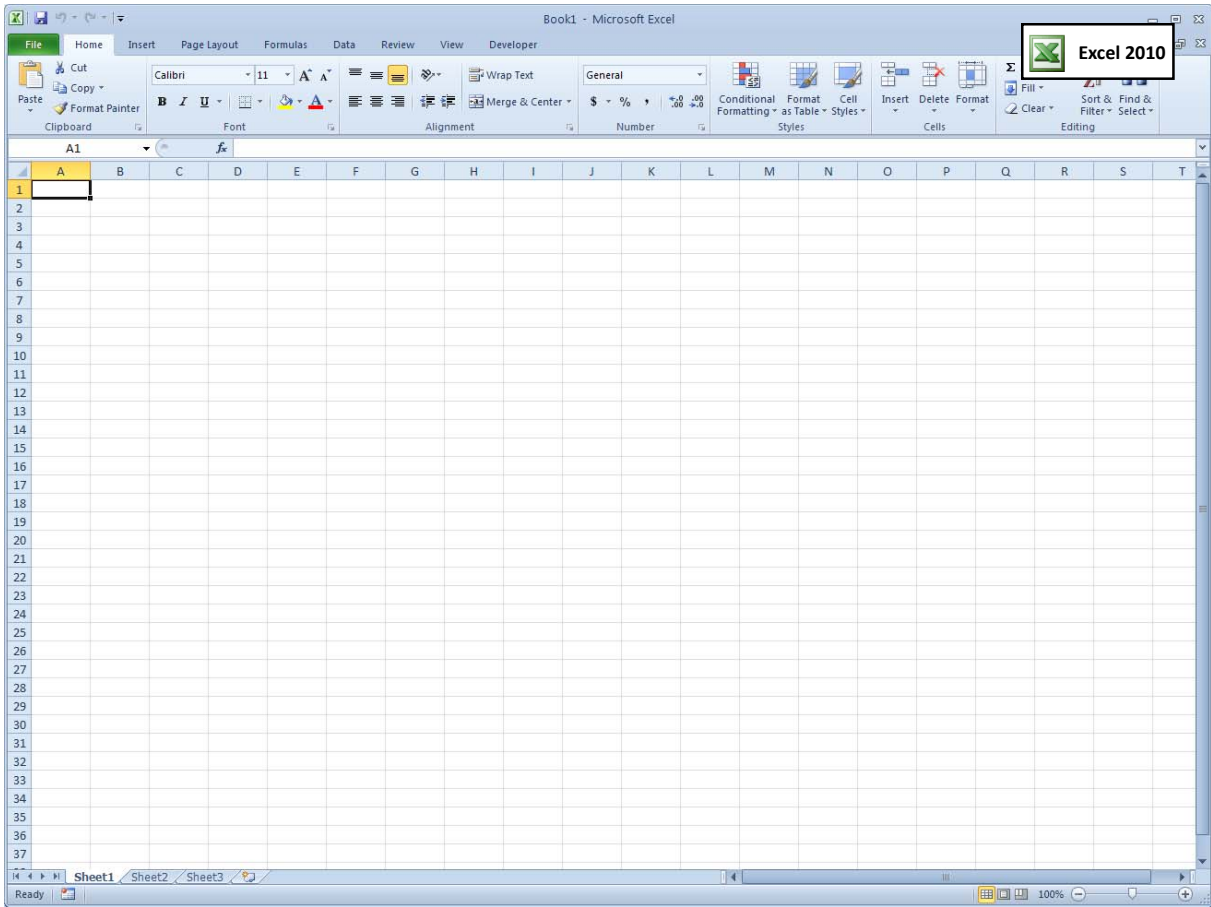
**Very useful for ...**

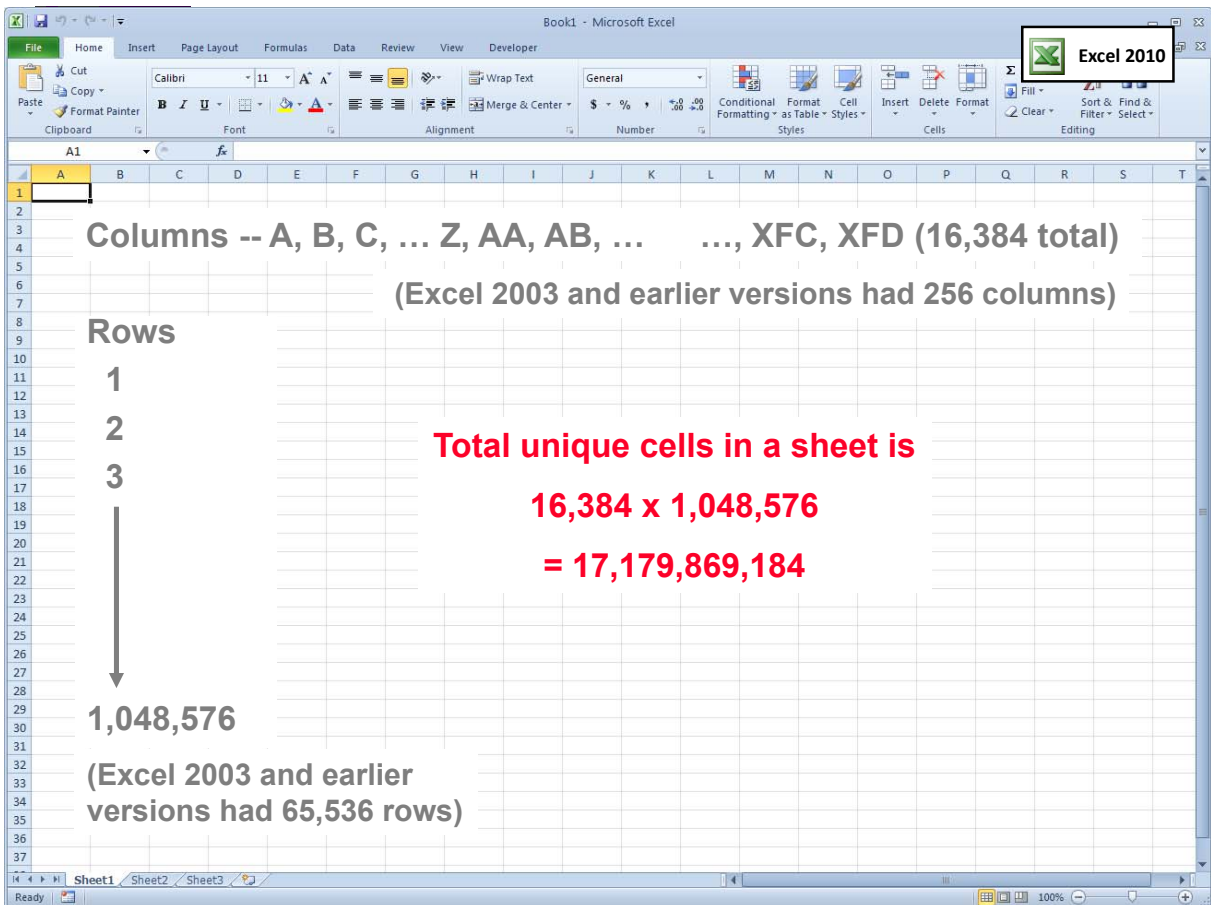
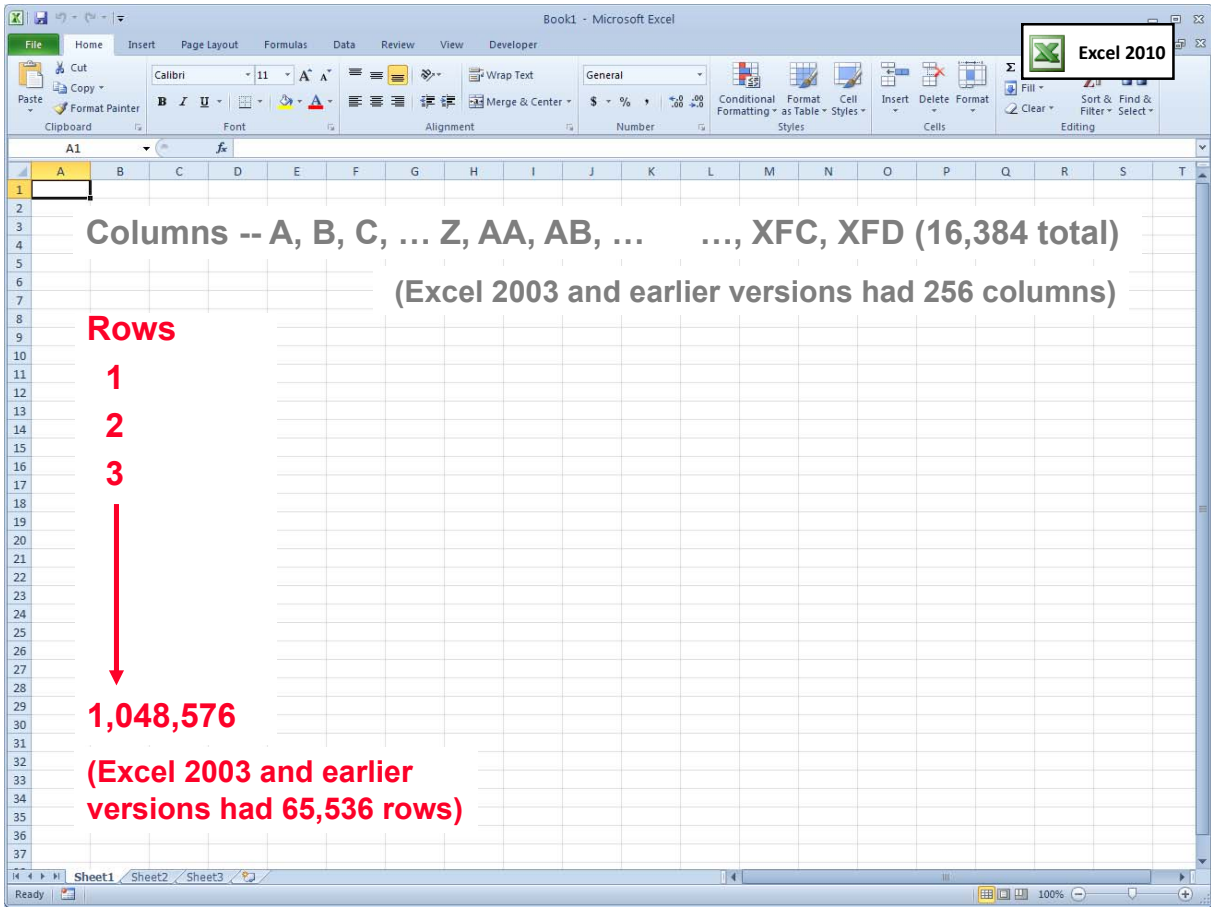
- Budgeting (“what if analysis”)
- Data storage/analysis
- Financial/production reports
- Anything numbers oriented

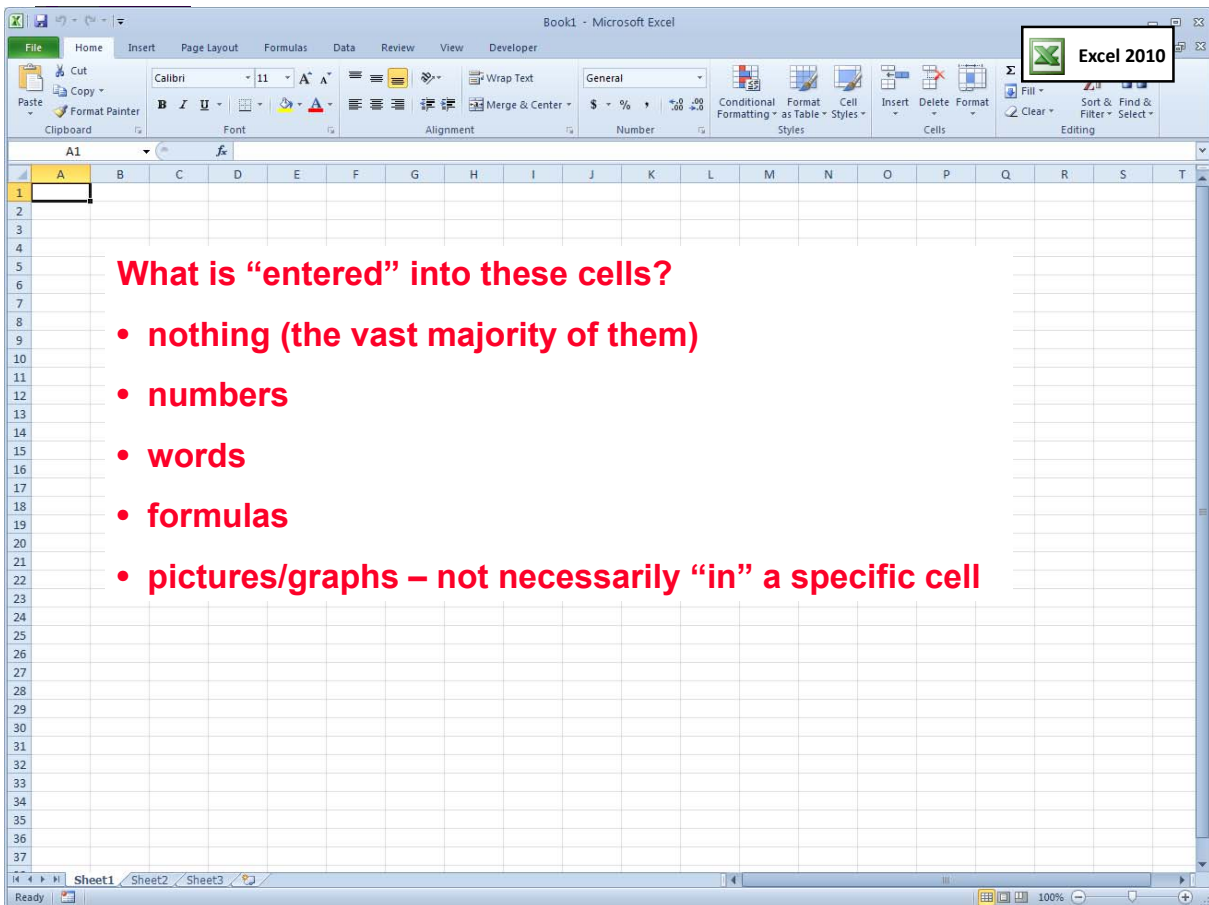
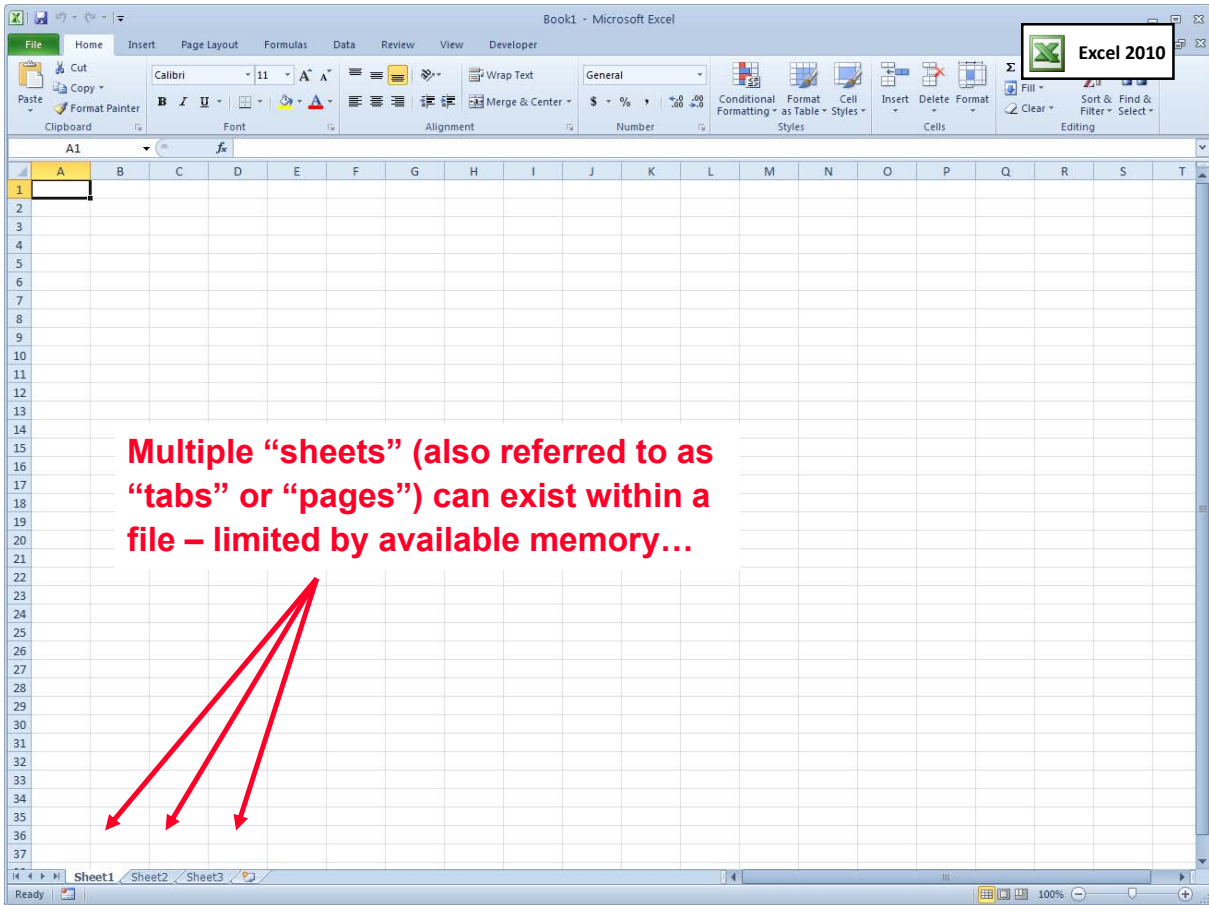
**Advantage: numerical visualization**



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## Spreadsheets

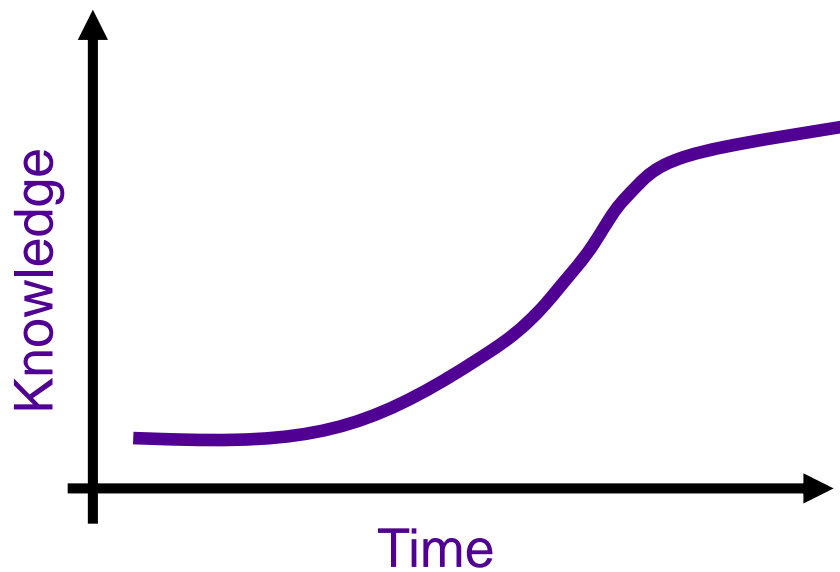
*Don't limit your thinking!!!*

*The capabilities of spreadsheets  
are much greater than most  
people realize!*



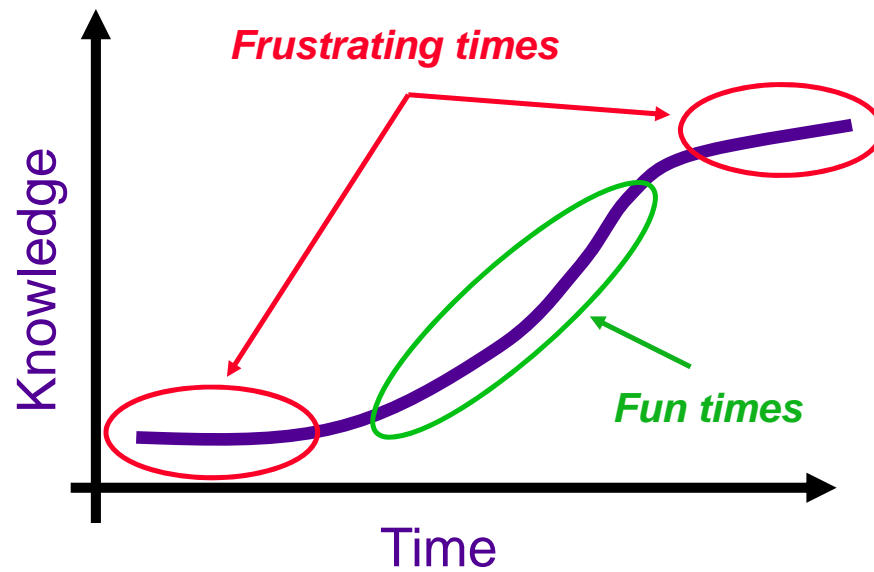
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## Hypothetical learning curve



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## *Hypothetical learning curve*



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## *Spreadsheets*

*You need to “invest” your time to make software productive.*

*Books, classes, videos, etc. are good references, but you still need to do the hands-on work.*



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## ***Before we get started ...***

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### **Your use of spreadsheets ...**

- What spreadsheet brand do you use?
- Frequency/intensity of use
- Examples of uses
- Good experiences
- Bad experiences
- Other comments/questions



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## ***Some of our uses of spreadsheets ...***

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- House refinancing
- Optimal SS fertilizer decisions
- Bookkeeping/reporting systems
- Math problems for kids
- Billing landlords
- Grain scale ticket summary for landlords
- Rate of return on retirement accounts
- Verifying mathematical formulas
- Transferring/sorting/manipulating data
- Calculator, ...

***In other words, just about anything number oriented***



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## ***What are we going to do?***

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- ➔ **Create several new spreadsheets**
  - 1) Machinery cost estimates
  - 2) Crop budgets and breakevens
  - 3) Loan payment and sales of commodities
  - 4) 205-day adjusted weaning weights



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## ***Time to get to work!***

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## Continuing on with the spreadsheet examples...

- 1) Machinery cost estimates
- 2) Crop budgets and breakevens
- 3) Loan payment and sales of commodities
- 4) 205-day adjusted weaning weights



Spreadsheets (11-12)--examples.xls [Compatibility Mode] - Microsoft Excel

Estimate of Per Acre and Farm Total Machinery Costs							
Breakdown of machinery costs by category				Crop acreage breakdown			
Fuel and oil		21.2%		Wheat	800		
Repairs		16.3%		Milo	400		
Labor		24.8%		Soybeans	400		
Depreciation		21.5%		Farm Total	1,600		
Interest		12.6%					
Insurance and shelter		3.6%					
<b>Total</b>		<b>100.0%</b>					
Operation	\$/acre	Wheat operations	\$/acre	Milo operations	\$/acre	Soybeans operations	Farm Total
Chisel	\$11.60	1.0	\$11.60	0.0	\$11.60	0.0	800
Disk	\$9.90	1.0	\$9.90	0.0	\$9.90	0.0	800
Field cultivate	\$9.50	1.0	\$9.50	0.0	\$9.50	0.0	800
Plant/drill	\$12.40	1.0	\$15.50	1.0	\$16.00	1.0	1,600
NH3 app.	\$10.90	1.0	\$10.90	1.0	\$10.90	0.0	1,200
Fertilizer app.	\$5.40	0.0	\$5.40	1.0	\$5.40	1.0	800
Herbicide app.	\$5.50	1.0	\$5.50	2.0	\$5.50	3.0	2,800
Insecticide/fungicide app.	\$5.50	1.0	\$5.50	0.0	\$5.50	0.0	800
Harvest	\$35.00	1.0	\$47.00	1.0	\$35.00	1.0	1,600
<b>Total</b>	<b>\$100.30</b>	<b>8.0</b>	<b>\$89.80</b>	<b>6.0</b>	<b>\$72.90</b>	<b>6.0</b>	<b>11,200</b>
Machinery Costs by Category	\$/acre	enterprise	\$/acre	enterprise	\$/acre	enterprise	Total
Fuel and oil	\$21.26	\$17,011	\$19.04	\$7,615	\$15.45	\$6,182	\$30,808
Repairs	\$16.35	\$13,079	\$14.64	\$5,855	\$11.88	\$4,753	\$23,687
Labor	\$24.87	\$19,900	\$22.27	\$8,908	\$18.08	\$7,232	\$36,039
Depreciation	\$21.56	\$17,252	\$19.31	\$7,723	\$15.67	\$6,269	\$31,244
Interest	\$12.64	\$10,110	\$11.31	\$4,526	\$9.19	\$3,674	\$18,310
Insurance and shelter	\$3.61	\$2,889	\$3.23	\$1,293	\$2.62	\$1,050	\$5,232
<b>Total</b>	<b>\$100.30</b>	<b>\$80,240</b>	<b>\$89.80</b>	<b>\$35,920</b>	<b>\$72.90</b>	<b>\$29,160</b>	<b>\$145,320</b>

Spreadsheets (11-12)--examples.xls [Compatibility Mode] - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer

Clipboard Font Alignment Number Styles Cells Editing

AutoSum Fill Clear Sort & Filter Find & Select

1

2 **Returns from various crop enterprises on crop share rented acres**

3

4 **Acres** 80.0 40.0 40.0 160.0

5

6 **Share Wheat Share Milo Share Soybeans Total\***

7 **Seed** 100.0% \$14.00 100.0% \$16.00 60.0% \$46.50 \$2,876

8 **Herbicide** 100.0% 6.00 60.0% 34.00 60.0% 15.00 \$1,656

9 **Insecticide/fungicide** 66.7% 0.00 60.0% 0.00 60.0% 0.00 \$0

10 **Fertilizer** 66.7% 68.00 60.0% 72.00 60.0% 23.00 \$6,907

11 **Lime** 0.0% 5.00 0.0% 5.00 0.0% 5.00 \$0

12 **Crop insurance** 66.7% 14.00 60.0% 12.00 60.0% 15.00 \$1,395

13 **Crop consulting** 100.0% 0.00 100.0% 0.00 100.0% 0.00 \$0

14 **Machinery costs** 100.0% 101.50 100.0% 91.80 100.0% 72.90 \$14,708

15 **Non-machinery labor** 100.0% 15.00 100.0% 15.00 100.0% 15.00 \$2,400

16 **Miscellaneous** 100.0% 6.25 100.0% 6.25 100.0% 6.25 \$1,000

17 **Total cost** \$197.42 \$199.85 \$153.85 \$29,942

18

19 **Yield** 66.7% 48 60.0% 85 60.0% 35 n/a

20 **Price** 100.0% \$6.50 100.0% \$5.10 100.0% \$11.00 n/a

21 **Gov't payment** 66.7% \$14.00 60.0% \$14.00 60.0% \$14.00 \$1,419

22 **Total income** \$217.33 \$268.50 \$239.40 \$37,703

23

24 **Net return to producer** \$19.91 \$68.65 \$85.55 \$7,761

25 **Breakeven yield** 43.4 62.6 22.0 n/a

26 **Breakeven price** \$5.88 \$3.75 \$6.93 n/a

27 **Total returns over total costs** \$96.25 \$195.45 \$200.35 \$23,532

28 \* Total for operator's share only

29

30

31

32

Machinery costs Crop budgets Loan payment 205-day weight

Ready

**Formulas are linked to Machinery costs tab**

Spreadsheets (11-12)--examples.xls [Compatibility Mode] - Microsoft Excel

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Clipboard Font Alignment Number Styles Cells Editing

AutoSum Fill Clear Sort & Filter Find & Select

1

2 **Determining principal and interest payment and sales needed to cover loan payment**

3

4 **Principal** \$150,000 **Loan payment**

5 **Interest rate** 6.25% \$36,851.98

6 **Years** 5

7

8

9 **Beginning Inventory Sales Ending Inventory**

10 **Quantity Value/unit Total value Quantity Value % Quantity Total value**

11 **Steer calves** 33 \$889.00 \$29,337.00 1 \$889.00 98.6% 32 \$28,448.00

12 **Wheat** 8,500 \$6.75 \$57,375.00 1 \$6.75 0.7% 8,499 \$57,368.25

13 **Milo** 13,000 \$6.16 \$80,080.00 1 \$6.16 0.7% 12,999 \$80,073.84

14

15 **Total** \$166,792.00 \$901.91 100% \$165,890.09

16

17

18

19 **Sales of wheat and milo must be in 500 bushel increments**

20 **Income from any one enterprise must be at least 20% of total, but no more than 50%**

21

22

23 **Calculating the value per head of the steer calves**

24 **Weight \$/cwt \$/head**

25 **Steer calves** 635 \$140.00 \$889.00

26

27

28

29 **Difference between sales and payment** -\$34,950.07

30

31

32

Machinery costs Crop budgets Loan payment 205-day weight

Ready

Spreadsheets [11-12]-examples.xls [Compatibility Mode] - Microsoft Excel

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Calculating 205-day adjusted weaning weight of beef calves

Weaning date 10/15/11

	205	205-day	205-day	205-day	205-day	205-day	205-day	205-day	205-day	205-day	205-day	205-day
	day wt.	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW	Adj. WW
Calf ID	Date of birth	Birth weight	Sex M=1, F=0	Age of dam	Weaning weight	Age at weaning	ADG	day wt.	Dam adj.	Adj. WW	Adj. WW	Index
10-1	02/19/11	93	1	6	610	238	2.17	538	0	538	0.961	
10-2	03/18/11	78	1	2	575	211	2.36	561	60	621	1.109	
10-3	03/18/11	81	0	2	540	211	2.18	527	54	581	1.043	
10-4	03/24/11	85	1	5	585	205	2.44	585	0	585	1.045	
10-5	03/29/11	68	0	7	510	200	2.21	521	0	521	0.936	
10-6	04/02/11	74	0	4	505	196	2.20	525	18	543	0.975	
10-7	04/02/11	83	1	12	520	196	2.23	540	20	560	1.000	
10-8	04/02/11	69	1	8	490	196	2.15	509	0	509	0.910	
10-9	04/11/11	76	0	3	505	187	2.29	546	36	582	1.046	
10-10	04/15/11	73	1	6	495	183	2.31	546	0	546	0.975	
Average	03/26/11	78.0	0.60	5.5	534	202	2.25	540	18.8	559	1.000	
Minimum	02/19/11	68.0	0.00	2.0	490	183	2.15	509	0.0	509	0.910	
Maximum	04/15/11	93.0	1.00	12.0	610	238	2.44	585	60.0	621	1.109	
Range	55	25.0	1.00	10.0	120	55	0.29	76	60.0	112	0.199	
Average for male calves										559.9		
Average for female calves										556.8		

Machinery costs Crop budgets Loan payment 205-day weight

# Excel Tips & Tricks



Kevin Dhuyvetter and Terry Kastens

**What average prices and seasonal indices for Kansas**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	\$2.71	\$2.75	\$2.76	\$2.79	\$2.80	\$2.80	\$2.74	\$2.76	\$2.76	\$2.75	\$2.72	\$2.70
1977	\$2.73	\$2.68	\$2.67	\$2.68	\$2.69	\$2.69	\$2.70	\$2.71	\$2.71	\$2.71	\$2.71	\$2.71
1978	\$2.69	\$2.62	\$2.70	\$2.69	\$2.70	\$2.70	\$2.70	\$2.70	\$2.70	\$2.70	\$2.70	\$2.70
1979	\$2.71	\$2.70	\$2.67	\$2.74	\$2.62	\$2.66	\$2.69	\$2.69	\$2.70	\$2.70	\$2.70	\$2.70
1980	\$2.65	\$2.36	\$2.26	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21
1981	\$2.52	\$2.27	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26	\$2.26
1982	\$2.50	\$2.12	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14	\$2.14
1983	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1984	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1985	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1986	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1987	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1988	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1989	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1990	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1991	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1992	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1993	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1994	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1995	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1996	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1997	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1998	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
1999	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2000	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2001	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2002	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2003	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2004	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2005	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2006	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2007	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2008	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2009	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2010	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2011	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20
2012	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20

**Cattle, Seasonal, Cash, lbs** -- a spreadsheet of historical cattle prices in Kansas that can be used to examine seasonal price patterns and value of gain for different weights of cattle.

Last updated: 10/14/11

Class of cattle - Prices  
 8 mos 1.6 cat. prices  
 Class of cattle - Value of gain  
 7 mos 1.6 cat. prices (100 lbs)

Seasonal Value of gain

Starting month (Year-1, Feb-1, etc)	1	2	3	4	5	6
Class (weight) of Cattle - Starting	500 B. wt.	500 B. wt.	400 B. wt.	500 B. wt.	500 B. wt.	500 B. wt.
Ending month (Year-0, Nov-1, etc)	2	2	4	7	8	10
Class (weight) of Cattle - Ending	750 B. wt.	500 B. wt.	600 B. wt.	750 B. wt.	500 B. wt.	500 B. wt.
Weight gain	250	200	200	250	200	200
Months - Average daily gain (lb/day)	1.64	1.64	1.50	1.50	1.50	1.50

Months between starting and ending periods and calculated average daily gain (lb/day) assuming 30.5 days per month.

Presented at 2011/12 MAST On-campus session November 15-16

## *Working with spreadsheets...*

- Random thoughts
- Tricks/techniques we use
- View/work with examples of uses



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## *Random thoughts*

- Black swan phenomenon:  $\frac{1}{3} + \frac{-4}{6} = \frac{-3}{9}$
- Always a better way
- No numbers in formulas
- Save/rename files (saving files off web)
- Multiple ways to do things
  - keyboard vs mouse
- Organizing data
  - rows vs. columns
  - multiple tabs and files



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## ***Random thoughts***

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- Mistakes? Outdated? Truth?
- Would a calculator/worksheet be the route to go?
- Formatting – how important is it?
- Documenting your thoughts and procedures with text in the spreadsheet
  - text in cell, cell comment, color, etc.



## ***Techniques/tricks***

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**Absolute vs. relative**  
**Copying/moving issues**  
tick trick (convert formula to label)  
RT copy trick  
**Search and replace**  
**/ rv**  
**“xxx” or -999 or “na” or “”**  
**Inputs blue**  
**Consistency across tabs/sheets**





## ***Techniques/tricks: One&Zero***

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The power of ones and zeros ...

An easy way to do conditional statistics using the sumproduct command, along with ones and zeros, to eliminate the need for repeatedly re-specifying formulas.



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## ***Techniques/tricks: Rand&Hold***

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The power of circular references ...

- Iterate to convergence (make sure you recalculate sufficiently)



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## ***Techniques/tricks: Stepwise formulas***

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**Long formulas lead to errors**

**Computer won't take the formula**

**Computer takes a wrong formula**

**Split long formulas into multiple cells and “build up” to the final value. These stepwise formulas can be combined by using copy and paste until the final formula no longer depends on the individual cells.**



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## ***Using Solver***

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**Using the Excel *Solver* function you can find mathematical solutions that might be hard to find otherwise (analytically)**

***Solver* can find a solution that ...**

- equals
- maximizes
- minimizes



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## ***Spreadsheet examples ...***

- **Crop budgets**
- **Cattle budgets**
- **Price database (seasonal indices, charts)**
- **Depreciation/loans**
- **Crop planning/records**
- **Fertilizer rates**
- **Landowner rent report**
- **Breakeven cattle prices**



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## ***Questions?***



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