

## Excel Births Activity

Eric Gaze *Thinking Quantitatively: Communicating with Numbers* Update 2016

Projects and Articles: <https://thinkingquantitatively.wordpress.com/>

Percentages are used to help make the size of different parts of a whole easier to compare. Consider the following table showing births and rates from the National Vital Statistics Report:

6 National Vital Statistics Reports, Vol. 65, No. 3, June 2, 2016

**Table 1. Births and birth rates, by age of mother: United States, final 2014 and preliminary 2015**

[Data for 2015 are based on a continuous file of records received from the states. Figures for 2015 are based on weighted data rounded to the nearest individual, so categories may not add to totals. Rates are per 1,000 women in specified age group. Rates for all ages are the total number of births (regardless of the age of the mother) per 1,000 women aged 15–44]

Age of mother	2015		2014	
	Number	Rate	Number	Rate
All ages	3,977,745	62.5	3,988,076	62.9
10–14	2,503	0.2	2,769	0.3
15–19	229,888	22.3	249,078	24.2
15–17	61,223	9.9	66,791	10.9
18–19	168,665	40.7	182,287	43.8
20–24	851,142	76.9	882,567	79.0
25–29	1,152,660	104.3	1,145,392	105.8
30–34	1,093,898	101.4	1,081,058	100.8
35–39	527,168	51.7	508,748	51.0
40–44	111,611	11.0	110,021	10.6
45–54 <sup>1</sup>	8,876	0.8	8,443	0.8

<sup>1</sup>The birth rate for women in this age group is computed by relating the number of births to women aged 45 and over to women aged 45–49, because most of the births in this group are to women aged 45–49.

NOTE: For information on the relative standard errors of the data and further discussion of random variation, see reference 6.

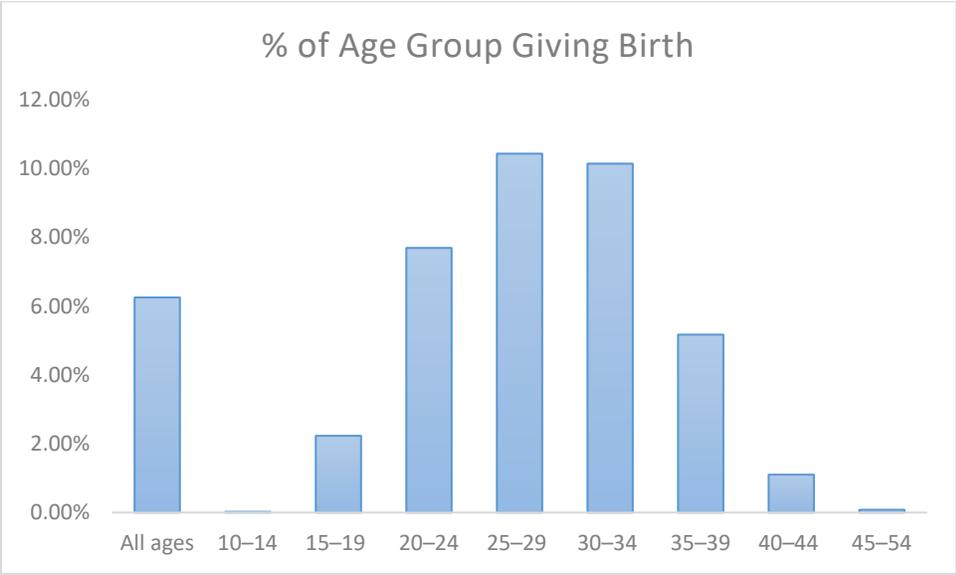
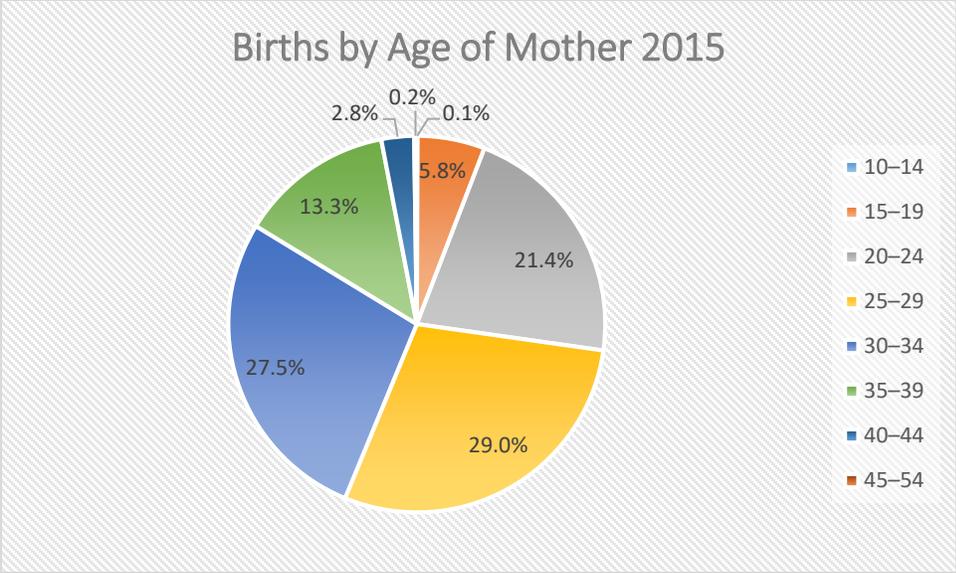
1. The table gives number of births for different age groups and also birth rates. Use these statistics to compute the population size of each age group.
2. Compute the percentage of total births for each age group.
3. Create a graphic to visualize these percentages.
4. Compute the percentage of age group population giving birth.
5. Create a graphic to visualize these percentages.

	A	B	C	D	E	F	G	H
1		2015				2014		
2	Age of Mother	Number of Births	Population	% of Births	% of Age Group	Rate	Number	Rate
3	All ages	3,977,745		100%		62.5	3,988,076	62.9
4	10–14	2,503				0.2	2,769	0.3
5	15–19	229,888				22.3	249,078	24.2
6	20–24	851,142				76.9	882,567	79
7	25–29	1,152,660				104.3	1,145,392	105.8
8	30–34	1,093,898				101.4	1,081,058	100.8
9	35–39	527,168				51.7	508,748	51
10	40–44	111,611				11	110,021	10.6
11	45–54	8,876				0.8	8,443	0.8

	A	B	C	D	E	F	G	H
1		2015					2014	
2	Age of Mo	Number of Births	Population	% of Births	% of Age Group	Rate	Number	Rate
3	All ages	3,977,745	63,643,920	100%	6.25%	62.5	3,988,076	62.9
4	10-14	2,503	=B4*1000/F4	0.06%	0.02%	0.2	2,769	0.3
5	15-19	229,888	10,308,879	5.78%	2.23%	22.3	249,078	24.2
6	20-24	851,142	11,068,166	21.40%	7.69%	76.9	882,567	79
7	25-29	1,152,660	11,051,390	28.98%	10.43%	104.3	1,145,392	105.8
8	30-34	1,093,898	10,787,949	27.50%	10.14%	101.4	1,081,058	100.8
9	35-39	527,168	10,196,673	13.25%	5.17%	51.7	508,748	51
10	40-44	111,611	10,146,455	2.81%	1.10%	11	110,021	10.6
11	45-54	8,876	11,095,000	0.22%	0.08%	0.8	8,443	0.8
12								
13			87,169,512	100.00%				
14								

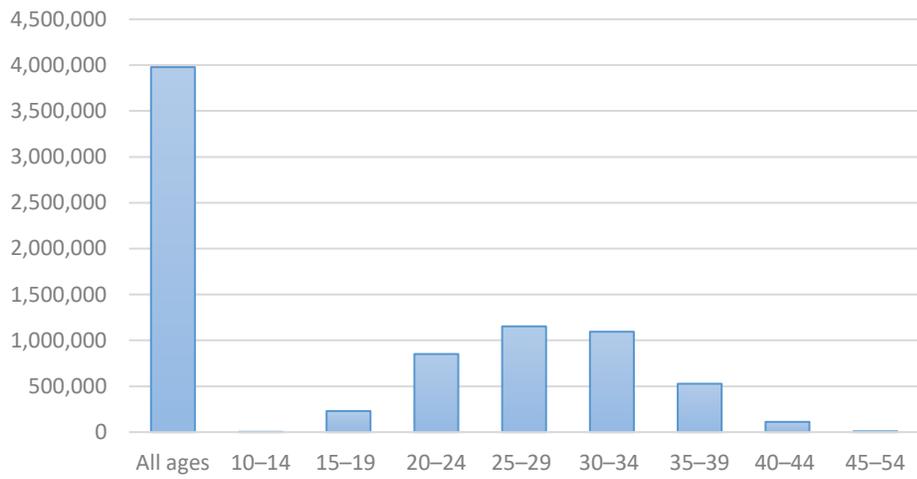
	A	B	C	D	E	F	G	H	I
1		2015					2014		
2	Age of Mo	Number of Births	Population	% of Births	% of Age Group	Rate	Number	Rate	
3	All ages	3,977,745	63,643,920	100%	6.25%	62.5	3,988,076	62.9	
4	10-14	2,503	12,515,000	=B4/B\$3	0.02%	0.2	2,769	0.3	
5	15-19	229,888	10,308,879	5.78%	2.23%	22.3	249,078	24.2	
6	20-24	851,142	11,068,166	21.40%	7.69%	76.9	882,567	79	
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4	10-14	2,503	12,515,000	=B4/C4		0.2	2,769	0.3
5	15-19	229,888	10,308,879	5.78%	2.23%	22.3	249,078	24.2
6	20-24	851,142	11,068,166	21.40%	7.69%	76.9	882,567	79
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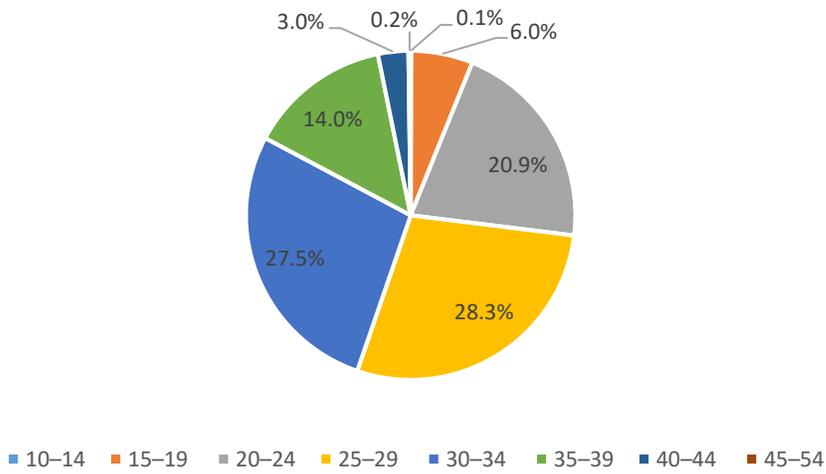


Why can't we just graph the number of births?

### Number of Births



### Incorrect Pie Chart of Percentages of Age Groups



**Excel HW Chapter 2 #5** Update to *Thinking Quantitatively* by Eric Gaze

The National Center for Health Statistics tracks health statistics and in this problem you will look at mortality data from 2010 (*National Vital Statistics Report*, Vol. 61, No. 4, May 8, 2013).

a.) The table gives you the top 15 leading causes of deaths and actual number of deaths. In **Column D** compute the **part-to-whole ratio** of each of these to the number of deaths from all causes. Format as a decimal to 4 places.

b.) In **Column E** rewrite this decimal as a percentage to one decimal place, note that the column is labeled “Percent” so you are just moving the decimal place.

c.) In **Column F** compute the crude death rate per 100,000 people using the population given. Your formula should compare the number of deaths to the population and factor in the 100,000.

	A	B	C	D	E	F
1		2010 Population (US Census 2010):	308,745,538			
2	Rank	Cause of Death	Number	Proportion of Total Deaths	Percent of Total Deaths	Crude Death Rate (2010)
3		All causes	2,468,435	Decimal	100.0	799.5
4	1	Diseases of heart	597,689			
5	2	Malignant neoplasms	574,743			
6	3	Chronic lower respiratory diseases	138,080			
7	4	Cerebrovascular diseases	129,476			
8	5	Accidents (unintentional injuries)	120,859			
9	6	Alzheimer’s disease	83,494			
10	7	Diabetes mellitus	69,071			
11	8	Nephritis, nephrotic syndrome and nephrosis	50,476			
12	9	Influenza and pneumonia	50,097			
13	10	Intentionalself-harm (suicide)	38,364			
14	11	Septicemia	34,812			
15	12	Chronic liver disease and cirrhosis	31,903			
16	13	Essential hypertension and hypertensive renal disease	26,634			
17	14	Parkinson’s disease	22,032			
18	15	Pneumonitis	17,011			
19		All other causes	483,694	0.196	19.6	156.7



SUM				=C4/\$C\$1*100000		
A	B	C	D	E	F	G
1	2010 Population (US Census 2010):	308,745,538				
2	Rank	Cause of Death	Number	Proportion of Total Deaths	Percent of Total Deaths	Crude Death Rate (2010)
3		All causes	2,468,435	Decimal	100.0	799.5
4	1	Diseases of heart	597,689	0.2421	24.2	=C4/\$C\$1*100000
5	2	Malignant neoplasms	574,743	0.2328	23.3	186.2
6	3	Chronic lower respiratory diseases	138,080	0.0559	5.6	44.7
7	4	Cerebrovascular diseases	129,476	0.0525	5.2	41.9
8	5	Accidents (unintentional injuries)	120,859	0.0490	4.9	39.1
9	6	Alzheimer's disease	83,494	0.0338	3.4	27.0
10	7	Diabetes mellitus	69,071	0.0280	2.8	22.4
11	8	Nephritis, nephrotic syndrome and nephrosis	50,476	0.0204	2.0	16.3
12	9	Influenza and pneumonia	50,097	0.0203	2.0	16.2
13	10	Intentional self-harm (suicide)	38,364	0.0155	1.6	12.4
14	11	Septicemia	34,812	0.0141	1.4	11.3
15	12	Chronic liver disease and cirrhosis	31,903	0.0129	1.3	10.3
16	13	Essential hypertension and hypertensive renal disease	26,634	0.0108	1.1	8.6
17	14	Parkinson's disease	22,032	0.0089	0.9	7.1
18	15	Pneumonitis	17,011	0.0069	0.7	5.5
19		All other causes	483,694	0.196	19.6	156.7
20						Rank

Age Adjusted Death Rate							
		Percent Change	Ratio				
		2009-2010	Male	Female	Total	Male	Female
nk	2010	2010	Male	Female	Total	Male	Female
	747.0	-0.3	1.4	1.0	2.4	1,439,920	1,028,515
1	179.1	-2.0	1.6	1.0	2.6	=J20/L20*C4	229,880
2	172.8	-0.4	1.4	1.0	2.4	335,267	239,476
3	42.2	-1.2	1.3	1.0	2.3	78,045	60,035
4	39.1	-1.3	1.0	1.0	2.0	64,738	64,738
E	28.0	1.2	2.0	1.0	2.0	80,572	40,286

## **Gas Cost vs. MPG**

Here is a real-life quandary I want your help in answering.

### **Should I buy gas at BJs or Irving?**

Both gas stations are close to my house but they range in price. If I go to BJs (New Hampshire) to buy my gas I pay approximately \$2.16 per gallon, but the fuel efficiency is not as good as when I buy my gas at Irving (Maine). My car goes approximately 30 miles per gallon on the gas I buy at BJs. If I go to Irving I pay approximately \$2.28 per gallon and my car goes about 32 miles per gallon.

Each week I drive between 400 and 500 miles and the gas tank holds 14 gallons. If I plan this driving schedule until May 18th (final exam day), from which gas station should I purchase my gas in order to save money? How much money will I save?

**Your job is to make a user-friendly spreadsheet so I can answer these questions as the gas prices fluctuate.**

## Quantitative Reasoning

### Project 1: *Gradebook*



In this project you will create a spreadsheet which keeps track of your grade in this Math 50 class. In addition to simply recording all of your grades for the course, it will provide you with a “**running tally**” of how you are doing in the course at any point in time during the semester.

1. **(5%)** What does “running tally” mean? To help you understand this, compute the grade of a student with an 8.2 HW average, 7.3 Quiz average, a 92 on Project 1 and a 93 on the first exam. Use the syllabus to determine the **appropriate weights** for each category and enter a formula in a spreadsheet to compute their grade. Re-compute their grade assuming they get a 95 on Project 2.

**Insert a textbox** into the spreadsheet and record both grades in the textbox. Are you surprised by their grades? Explain what weights dominate at this point in the semester.

2. **(10%)** Create a new sheet in the spreadsheet from part 1 which will allow you to enter all of your grades for this Math 50 course. To start, **you may make up grades for some but not all** of the possible assignments (so enter the HW and quiz grades you already have, and make up 2 projects and make up 1 exam grade). There should be **nicely labeled spaces** 😊 for all of the following work:
  - a) Assume there will be 12 HW assignments for article questions and 12 HW assignments for Excel Problems and 12 HW assignments for written Exercises. HW graded 0-10 points.
  - b) Assume there will be 12 quizzes on the articles and 12 quizzes on the Exercises. Quizzes graded 0-10 points.
  - c) There will be 4 projects. **Projects** graded 0-100 points.
  - d) There will be 2 exams. **Exams** graded 0-100 points.
3. **(10%)** Create cells which will compute the **average** HW grade, average quiz grade, average project grade, and average exam grade. **Name** these cells appropriately, so if used in a formula the name will appear not the cell reference.

4. **(10%)** Create cells which will **count** the number of HW grades entered so far, count the number of quiz grades, number of project grades, and number of exam grades. **Name** these cells appropriately, so if used in a formula the name will appear not the cell reference.
5. **(5%)** Create cells which will compute the **max** and **min** grades for each of the 4 categories: HW, quiz, project, and exam.

6. **(20%)** Create a **Histogram** of your HW grades and your Quiz grades, you must put both in one chart. Above each bin you should have two columns, one for HW and one for Q.

You must choose appropriate bin sizes so that there is more than just one pair of columns in your chart.

Keep the chart next to where you enter grades, not on a separate sheet, so when you enter your grades the columns will change... WOOOHOOOO!

7. **(5%) Format** all of this nicely with borders and shading ☺ Try to arrange so that it all fits onto one screen when Excel is opened to the max width of the monitor screen.
8. **(20%)** Create a cell which computes your total grade using the ideas of **weighted average** as discussed in class. The formula must take into account the “counts” of your grades. This formula must be linked to all of your input cells, so when you enter a grade it automatically updates.
  - a) You may use the **average** for the HW and Quizzes as counting for the full weight of that category,
  - b) **but** you must **weight each** project and exam individually.
9. **(10%)** Create a cell which computes the **highest possible average** you can get in the class. You may assume your HW and Quiz averages are fixed (you can use the averages on the sheet) but you should assume that you get a 100 on all remaining projects and exams. To do this you will once again have to **count** the number of projects and exam grades entered so far.
10. **(5%) Enter ONLY** your grades for the semester so far, your total grade formula should give you your grade at this point in the semester. If you get an error try again!