

## Proportional Reasoning Workshop

### Excel Problems

1. 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. **Column C** 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. 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. 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.
  - b. In **Column J** the CDC has computed the part-to-part ratio of **Male deaths to Female deaths** for each cause. Note the part-to-part ratio of 1.4 to 1 sums to a total of 2.4 given in Column M. Fill a formula down in **Column N** which adds 1 to each of the ratios in Column J. Next in **Column O** we can compute the actual number of deaths (for each cause) for Males using the part-to-whole ratio (Columns O and P) and the actual number of deaths in Column C. In **Column Q** now compute the actual number of deaths (for each cause) for Females.
  - c. Which of the top 15 causes is most likely to have a male death versus a female death? Answer is a number 1 – 15.
  - d. Which of the top 15 causes is most likely to have a black death versus a white death? Answer is a number 1 – 15.
  - e. Create a nicely labeled pie chart showing the top 5 causes of deaths and lump the next ten causes in with *All Other*. Label with percentages of the total.

SUM		X ✓ fx		=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							
Rank	2010	Percent Change	Ratio		Total	Black to White	
		2009-2010	Male to Female	Male			
	747.0	-0.3	1.4	1.4	1.0	2.4	1.2
1	179.1	-2.0	1.6	=I20/M20*C4	229,880	2.6	1.3
2	172.8	-0.4	1.4	335,267	239,476	2.4	1.2
3	42.2	-1.2	1.3	78,045	60,035	2.3	0.7
4	39.1	-1.3	1.0	64,738	64,738	2.0	1.4
5	38.0	1.3	2.0	80,573	40,286	3.0	0.8
6	25.1	3.7	0.8	37,108	46,386	1.8	0.8

1. You are buying a car and wish to do a cost/benefit analysis on buying a more expensive Prius, which gets better mileage, 51 city/48 highway mpg (miles per gallon), than a cheaper Ford Focus, which gets 27 city/37 highway mpg.
  - a) This information, including the costs of the cars, has been entered in the spreadsheet. Convert your mpg into gallons per 100 miles driven for both highway and city.
  - b) Cells have been created for the number of highway and city miles you drive each year. Compute how many gallons of gas each car will use for the year.
  - c) For the provided price per gallon of gas, compute the total cost of gas for each car.
  - d) In the given cells compute how much more you spend on gas each year for Focus versus Prius, and compute how much more the Prius costs versus the Focus.
  - e) Finally determine how long it will take the gas savings per year to make up for the extra cost of the Prius.

	A	B	C	D	E
1		Focus	Prius		
2	Cost	\$ 16,500.00	\$ 24,200.00	Focus	Prius
3				Gallons per 100 miles	
4	MPG Hway	37	48		
5	MPG City	27	51		
6				Gallons Used	
7	Miles Hway	12,000			
8	Miles City	7,500			
9			Total Gallons:		
10	Price per Gallon	\$ 3.22	Cost:		
11					
12			Gas Savings per year:		
13			Extra Cost:		
14			Years to recoup:		years
15					
16					
17					