Name: \_\_\_\_Kameron Mace\_\_\_\_\_\_\_\_\_

**Random Sampling Activity:** Sampling Segregation

*Most American cities have economic segregation. This means that households in the same neighborhood have similar incomes, but incomes across neighborhoods tend to be quite different. Multiple reports have found that San Antonio is one of the most economically segregated cities in the United States. The following activity investigates the challenges of sampling incomes in San Antonio.*

**Judgement Sample:** Select 5 homes that you think are *representative* of the whole population of San Antonio. Label the home numbers on the top lines and their incomes on the bottom lines. Calculate and write down the mean of these incomes in the space provided.

Home Number:

1 34 59 65 30

Income:

\_25k\_\_\_\_\_ \_\_\_56.5\_\_\_ \_\_139\_\_\_ \_\_\_\_20\_\_\_\_ \_\_\_58.5\_\_ Mean: \_\_59.8\_\_\_

Pros: Easy to implement Con: Biased

**Simple Random Sample (SRS):** Use a random number generator to select 5 unique homes numbered between 1-100. Label the home numbers, their incomes, and mean of their incomes.

Home Number:

\_23\_ \_4\_ \_77\_\_ \_1\_ \_2\_\_

Income:

\_\_\_\_30.5\_\_\_\_ \_\_\_56\_\_\_\_\_ \_\_\_\_76\_\_\_\_\_ \_\_\_25\_\_ \_\_\_\_26.5\_\_\_ Mean: \_\_\_42.8\_\_\_\_

Pros: Unbiased, moderately accurate Cons: would have to drive all over

**Cluster Random Sample:** Use a random number generator to find 1 home numbered between 1 and 100. Select that home as well as the four homes located closest to it on the map.

Home Number:

\_37\_\_ \_\_36\_ 38\_\_\_ \_39\_\_ \_30\_\_

Income:

\_\_44.5\_\_ \_\_\_42.5\_\_\_\_\_ \_\_\_\_41\_\_\_\_\_ \_\_\_43\_\_\_\_\_ \_\_\_58.5\_\_\_\_\_ Mean: \_\_\_45.9\_\_\_\_

Pros: unbiased Cons: high variability

**Stratified Random Sample:** Find the page with the title “Strata by Race-Ethnicity”, in which the homes are divided by predominant race. Use a random number generator to select 1 home within each of the 5 strata. For example, use RandInt(67,71,1) to select a Native American home, since the range for that strata is 67-71.

Home Number:

\_58\_\_ \_62\_\_ \_42\_\_ \_71\_\_ \_76\_\_

Income:

\_\_\_68\_\_ \_\_26\_\_ \_\_92.5\_ \_\_25\_\_\_ \_\_56\_\_\_\_ Mean: \_53.5\_\_\_\_

Pros: Unbiased, accurate, low variability Cons: Hardest to implement , need to have lots of data



**Systematic Random Sample:** Select a random number between 1 and 20. This is the first home. Add 20 to the first home number to select the second home. Add 20 more to get the third home. Repeat until you have 5 homes.

Home Number:

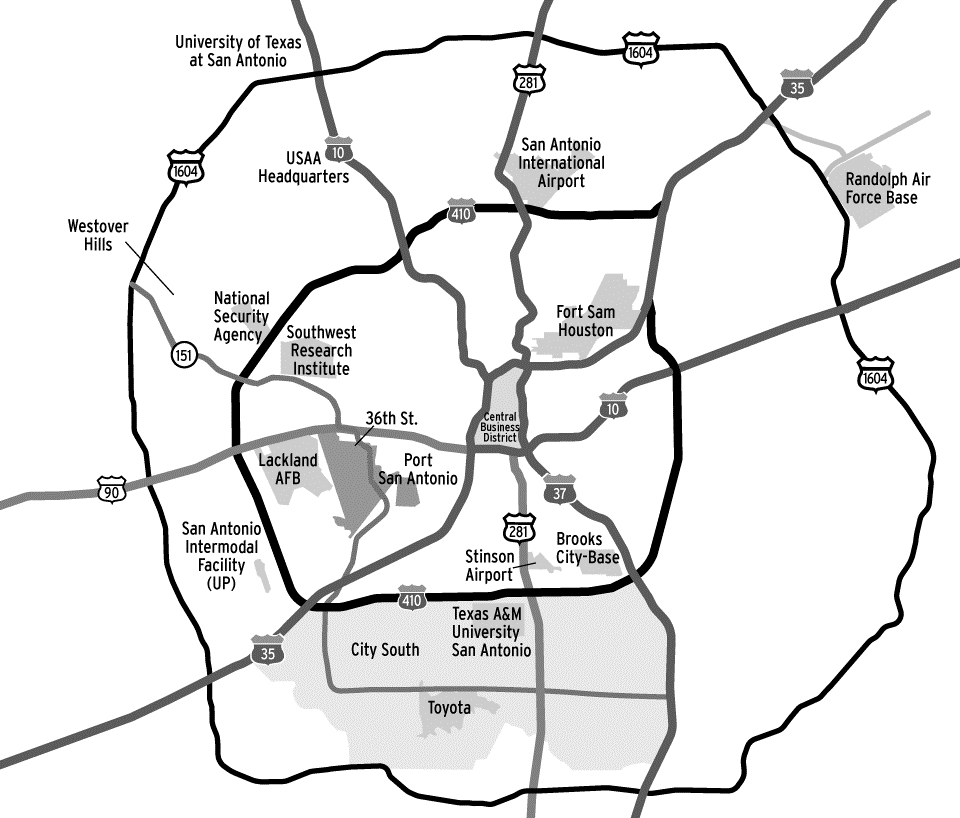
13\_\_\_ \_\_33\_ \_53\_\_ \_\_73\_ \_\_93\_

Income:

\_\_\_35.5\_\_ \_5.5\_\_\_\_ \_\_\_47\_\_\_ \_\_110\_\_\_\_ \_\_\_186\_\_\_ Mean: \_\_86.7\_\_\_\_\_

Pros: Unbiased Cons: moderate variability

TRUE MEAN: 61,000



**Key (Predominant Race in Home):**

Asian

Black

Hispanic

Native American

White

|  |  |
| --- | --- |
| **Home** | **Income** |
| 1 | $25,000 |
| 2 | $26,500 |
| 3 | $42,000 |
| 4 | $56,000 |
| 5 | $23,000 |
| 6 | $24,500 |
| 7 | $44,500 |
| 8 | $25,500 |
| 9 | $25,500 |
| 10 | $54,000 |
| 11 | $26,000 |
| 12 | $25,000 |
| 13 | $35,500 |
| 14 | $25,000 |
| 15 | $27,500 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 16 | $23,500 |
| 17 | $23,500 |
| 18 | $53,000 |
| 19 | $36,000 |
| 20 | $28,500 |
| 21 | $27,500 |
| 22 | $28,000 |
| 23 | $30,500 |
| 24 | $27,000 |
| 25 | $31,500 |
| 26 | $29,500 |
| 27 | $45,500 |
| 28 | $61,000 |
| 29 | $61,000 |
| 30 | $58,500 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 31 | $64,000 |
| 32 | $35,000 |
| 33 | $55,000 |
| 34 | $56,500 |
| 35 | $57,000 |
| 36 | $42,500 |
| 37 | $44,500 |
| 38 | $41,000 |
| 39 | $43,000 |
| 40 | $109,000 |
| 41 | $214,500 |
| 42 | $92,500 |
| 43 | $95,000 |
| 44 | $68,500 |
| 45 | $76,000 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 46 | $65,000 |
| 47 | $62,500 |
| 48 | $78,000 |
| 49 | $85,500 |
| 50 | $61,500 |
| 51 | $48,000 |
| 52 | $44,500 |
| 53 | $47,000 |
| 54 | $108,500 |
| 55 | $44,500 |
| 56 | $102,000 |
| 57 | $139,000 |
| 58 | $68,000 |
| 59 | $107,500 |
| 60 | $85,000 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 61 | $66,500 |
| 62 | $26,000 |
| 63 | $24,500 |
| 64 | $22,000 |
| 65 | $20,000 |
| 66 | $28,500 |
| 67 | $23,000 |
| 68 | $20,000 |
| 69 | $27,500 |
| 70 | $36,000 |
| 71 | $25,000 |
| 72 | $57,000 |
| 73 | $110,000 |
| 74 | $28,000 |
| 75 | $58,000 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 76 | $56,000 |
| 77 | $76,000 |
| 78 | $44,500 |
| 79 | $212,500 |
| 80 | $119,000 |
| 81 | $67,000 |
| 82 | $124,000 |
| 83 | $109,000 |
| 84 | $111,500 |
| 85 | $48,000 |
| 86 | $43,500 |
| 87 | $47,000 |
| 88 | $39,000 |
| 89 | $58,500 |
| 90 | $62,000 |

|  |  |
| --- | --- |
| **Home** | **Income** |
| 91 | $108,000 |
| 92 | $157,000 |
| 93 | $186,000 |
| 94 | $166,000 |
| 95 | $174,000 |
| 96 | $80,000 |
| 97 | $42,000 |
| 98 | $48,500 |
| 99 | $28,000 |
| 100 | $27,000 |

**Strata: By Race-Ethnicity**

**Asian**

**Black**

**Hispanic**

**Native American**

**White**

**Sampling Distributions for Each Sample Type**

**Judgement Sample x**

**X x**

**x x x x x x**

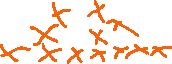


**---------|------------|------------|------------|------------|------------|------------|------------|------------|--------**



$20k $30k $40k $50k $60k $70k $80k $90k $100k

**Simple Random Sample (SRS)**

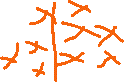


**---------|------------|------------|------------|------------|------------|------------|------------|------------|--------**



$20k $30k $40k $50k $60k $70k $80k $90k $100k

**Cluster Random Sample**



**---------|------------|------------|------------|------------|------------|------------|------------|------------|--------**

$20k $30k $40k $50k $60k $70k $80k $90k $100k

**Stratified Random Sample**

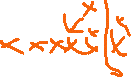


**---------|------------|------------|------------|------------|------------|------------|------------|------------|--------**



$20k $30k $40k $50k $60k $70k $80k $90k $100k

**Systematic Random Sample**



**---------|------------|------------|------------|------------|------------|------------|------------|------------|-------**



$20k $30k $40k $50k $60k $70k $80k $90k $100k

