

Name: _____

Date: _____

SAMPLING A POPULATION N-GEN[®] MATH 7



Statistics is used to answer questions about **populations**. But many times, we must settle for a **sample** of the population. In today’s lesson, we will compare **sample statistics** with the statistics of the **population** from which the **sample is drawn**.

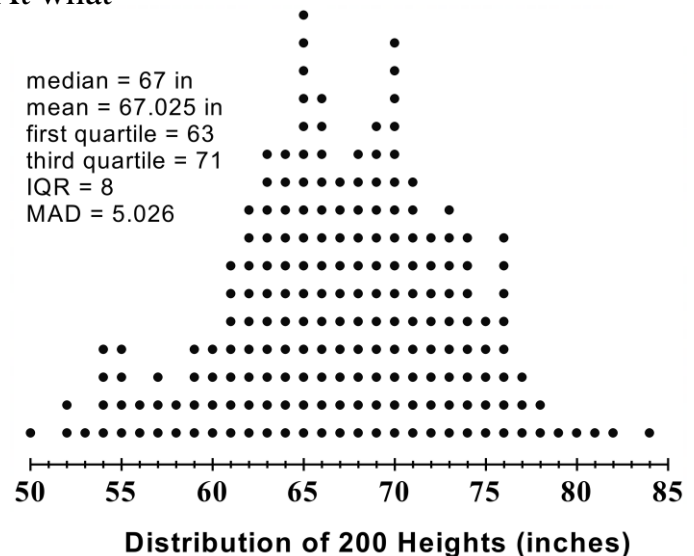
Exercise #1: If we were trying to answer the question “How tall are students in high school?” why would taking a sample of the 20 varsity boys basketball team members be **biased** or **not representative** of our population?

Exercise #2: A population of 200 heights of students in high school, in inches, is shown in the dot plot below and in **Table 1**. This population includes 100 girls and 100 boys. The relevant population statistics are shown along with the dot plot.

(a) The distribution has two fairly distinct peaks. At what heights do they occur?

(b) Why do you think there are two peaks?

(c) Is the range of the population more or less than twice the interquartile range?



(d) Is the population distribution symmetric, skewed, or neither? Explain your choice.



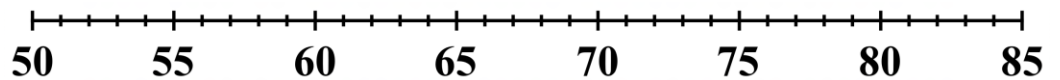
Exercise #3: Take a **random sample** of 20 values from this population. Do this by following the following directions:

1. Take the **day** of your birthday (1 through 31) and find that row in **Table 2**.
2. The row of your birthday has 20 random numbers between 1 and 200. Use these numbers as your **Data Points** to pick your sample of 20 values from **Table 1**. Write the data values below:

Exercise #4: Create a dot plot of your sample below. Then, find the (a) median and (b) the interquartile range (IQR) of your sample.

(a) median of sample

(b) IQR of sample



Exercise #5: How does your sample median and IQR compare to those of the population? Give the values for both and then state whether your sample value would **underestimate** or **overestimate** the corresponding value of the population.

(a) Median

(b) Interquartile Range

Population = _____

Population = _____

Sample = _____

Sample = _____

Sample is an _____

Sample is an _____

(c) How **representative** was your **sample** of the overall population?



Exercise #6: Work with three other classmates to come up with 4 total sets of sample data.

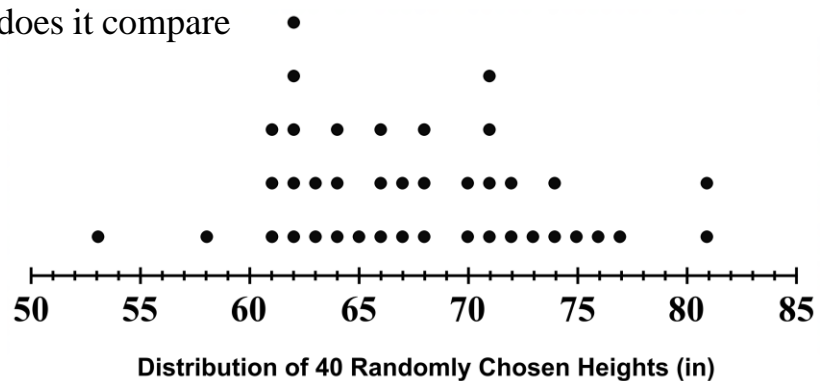
Sample	Median	Interquartile Range
Yours		
Classmate #1		
Classmate #2		
Classmate #3		

Exercise #7: Were any of the medians in the table above equal to the median of the population?

Exercise #8: Let's double the sample size to 40 instead of 20. A random sample of 40 heights from our population is taken and graphed on the number line below.

(a) Find the median of this sample. How does it compare to that of the population?

(b) Find the IQR of this sample. Is it closer to the population IQR than our samples of size 20?



(c) Generally, how does the size of a sample effect how **well it represents** the population?





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TABLE 1 – POPULATION HEIGHTS

Data Point	Value	Data Point	Value	Data Point	Value	Data Point	Value	Data Point	Value
1	70	41	63	81	63	121	74	161	73
2	59	42	59	82	68	122	64	162	73
3	68	43	70	83	66	123	64	163	74
4	65	44	66	84	58	124	73	164	70
5	76	45	62	85	56	125	73	165	65
6	64	46	65	86	61	126	67	166	76
7	62	47	57	87	65	127	78	167	80
8	66	48	61	88	64	128	69	168	66
9	63	49	62	89	66	129	73	169	74
10	65	50	65	90	55	130	78	170	72
11	52	51	63	91	70	131	68	171	69
12	66	52	67	92	60	132	66	172	70
13	70	53	66	93	55	133	64	173	71
14	71	54	63	94	67	134	65	174	79
15	54	55	65	95	59	135	70	175	70
16	62	56	66	96	54	136	70	176	73
17	63	57	63	97	53	137	69	177	75
18	61	58	68	98	73	138	69	178	61
19	60	59	68	99	50	139	84	179	73
20	70	60	69	100	60	140	58	180	72
21	54	61	57	101	72	141	72	181	70
22	68	62	61	102	71	142	67	182	71
23	62	63	56	103	67	143	74	183	76
24	63	64	70	104	71	144	71	184	65
25	57	65	67	105	69	145	75	185	65
26	55	66	73	106	61	146	76	186	66
27	55	67	69	107	72	147	66	187	59
28	68	68	64	108	67	148	60	188	71
29	69	69	76	109	65	149	74	189	66
30	52	70	62	110	66	150	65	190	69
31	65	71	68	111	67	151	61	191	70
32	64	72	69	112	77	152	71	192	69
33	68	73	64	113	68	153	67	193	67
34	62	74	54	114	81	154	65	194	75
35	64	75	63	115	82	155	72	195	77
36	68	76	65	116	76	156	74	196	71
37	62	77	74	117	74	157	70	197	70
38	63	78	63	118	64	158	76	198	75
39	65	79	72	119	77	159	75	199	72
40	62	80	64	120	69	160	71	200	76





TABLE 2 – RANDOM NUMBER TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	99	43	54	53	53	87	126	142	147	35	48	138	91	199	128	97	8	165	32	163
2	191	183	35	100	80	13	86	40	88	108	162	69	14	105	106	1	44	120	35	133
3	156	170	107	2	77	174	101	74	161	39	102	161	109	33	156	78	184	150	152	13
4	51	83	138	52	136	23	14	40	45	115	199	143	116	92	103	198	118	15	176	19
5	43	141	138	123	167	57	43	132	180	23	192	50	49	45	125	198	25	93	184	54
6	117	168	18	91	3	181	39	64	28	148	145	176	43	49	2	145	27	131	36	196
7	102	160	29	174	83	40	110	4	166	49	76	44	64	142	178	59	143	64	21	40
8	78	83	107	172	152	49	46	188	82	98	15	177	55	67	187	178	93	39	188	36
9	181	114	126	9	197	180	113	52	125	189	73	89	84	5	166	92	28	97	24	86
10	56	173	53	127	99	141	25	94	151	188	128	49	13	69	20	195	66	164	89	16
11	153	81	118	16	63	175	3	88	194	2	31	72	74	79	198	194	102	42	70	49
12	84	88	165	186	124	46	58	74	39	152	55	151	117	160	123	126	105	91	85	116
13	180	33	67	76	126	192	32	145	177	36	51	13	137	191	138	71	77	64	143	152
14	139	38	125	1	10	114	176	114	200	4	76	146	141	7	169	157	31	60	123	123
15	140	73	108	69	16	123	155	152	74	72	47	120	169	99	85	67	153	64	119	54
16	3	32	90	150	172	51	74	147	68	125	41	198	169	197	45	168	96	54	188	32
17	71	8	173	39	82	145	46	8	76	180	104	18	13	123	117	152	66	163	145	116
18	107	23	151	37	139	57	21	168	17	144	19	39	163	39	34	22	151	183	168	198
19	59	21	72	83	130	71	189	196	122	77	35	33	76	157	73	82	124	197	167	151
20	152	40	132	30	169	26	191	112	135	84	154	71	172	166	17	166	79	31	85	88
21	15	170	30	144	181	164	110	77	175	82	71	152	177	109	173	154	15	184	68	99
22	119	71	124	186	183	7	19	88	136	148	29	50	155	133	59	106	129	58	183	90
23	75	14	97	145	179	31	13	150	197	64	81	184	162	170	23	53	172	178	159	77
24	47	26	179	117	167	119	90	119	128	182	155	89	165	156	183	33	176	85	32	120
25	160	3	13	89	60	108	42	120	60	7	199	51	112	33	132	51	127	32	139	93
26	36	13	163	45	102	31	65	86	180	144	187	4	162	109	46	182	52	76	25	140
27	132	110	115	83	171	73	131	30	49	73	162	108	130	89	175	8	67	138	156	7
28	136	106	66	4	73	147	190	187	27	7	99	74	84	87	66	17	32	189	124	156
29	63	36	189	82	147	82	90	81	67	26	130	58	41	22	120	148	94	115	5	82
30	133	10	183	104	115	57	32	68	194	161	198	36	176	163	149	183	77	189	25	96
31	193	182	147	133	135	130	184	93	81	153	55	161	79	118	68	194	113	20	129	119





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SAMPLING A POPULATION N-GEN MATH[®] 7 HOMEWORK

FLUENCY

1. When sampling a population, the method chosen to sample should *not* be
 - (1) fair
 - (2) biased
 - (3) random
 - (4) complex_____

2. The range of a sample cannot be which of the following?
 - (1) equal to the range of the population
 - (2) larger than the range of the population
 - (3) smaller than the range of the population
 - (4) one half of the range of the population_____

3. As the size of the sample for a population gets larger, which of the following is true?
 - (1) the median of the sample must get larger
 - (2) the range of the sample must get larger
 - (3) the sample gets more representative of the population
 - (4) the sample gets more biased_____

4. Let's take another random sample, but of just 10 values this time. Do the following:
 - (a) Using only Table 1, go to the Data Point that corresponds to the day of your birthday (so if you were born on July 17th, go to Data Point 17).
 - (b) Write this value down plus the next 9 from the table for your sample of 10:

 - (c) Find the mean of your sample by adding up the 10 values and dividing by 10. Round to the nearest tenth if needed.

 - (d) The mean of the population is 67.025. How does that compare to your sample's mean?



5. Write down your sample of 10 and your sample mean as well below:

(a) For each data value, write down its distance (or deviation) from the mean. These will all likely involve decimals because your mean likely has a decimal.

Data Value										
Distance from Mean										

(b) Using your values from (a), calculate the mean absolute deviation of your sample.

(c) Was your sample's MAD larger or smaller than the population MAD of 5.026?

(d) There tends to be less variation in a sample of data than in a population of data. Was this true for your sample? Consider your answer to (c).

