S.ID.A.2: Dispersion 4

1 Conant High School has 17 students on its championship bowling team. Each student bowled one game. The scores are listed in the accompanying table.

Score (x_i)	**Frequency** (f_i)
140	4
145	3
150	2
160	3
170	2
180	2
194	1

Find, to the *nearest tenth,* the population standard deviation of these scores. How many of the scores fall within one standard deviation of the mean?

2 Mr. Koziol has 17 students in his high school golf club. Each student played one round of golf. The summarized scores of the students are listed in the accompanying table.

Score	**Frequency**
70	4
73	3
75	2
80	3
85	1
86	1
90	2
92	1

Find the population standard deviation of this set of students' scores, to the *nearest tenth*. How many of the individual students' golf scores fall within one population standard deviation of the mean?

3 The accompanying table represents the PSAT scores of a group of ten students.

Score	Frequency
48	1
50	3
53	1
54	2
57	1
62	1
68	1

Find the standard deviation to the *nearest tenth*. How many scores fall within one standard deviation of the mean?

4 The table below shows the number of defective light bulbs that were found in 20 random samples of 40 light bulbs.

x_i	f_i
0	2
1	2
2	2
3	2
4	4
5	2
6	2
7	2
8	1
9	0
10	1

Find the standard deviation of this set of numbers to the *nearest tenth*. How many samples fell within one standard deviation of the mean?

5 Hotels are rated on the basis of one star to five stars. The accompanying table represents the ratings of 50 hotels.

Number of Stars (x_i)	**Frequency** (f_i)
1	7
2	10
3	22
4	8
5	3

Find the standard deviation of this set of data to the *nearest hundredth*. How many of the hotels have ratings that fall within one standard deviation of the mean?

6 The table below shows the final examination scores for Mr. Spear's class last year.

Test Score	Frequency
72	1
76	1
79	4
83	5
85	7
88	5
94	3

Find the population standard deviation based on these data, to the *nearest hundredth*. Determine the number of students whose scores are within one population standard deviation of the mean.

7 Christina participated in 20 basketball games this season. The scorekeeper recorded the number of "shots" she attempted in each game. The table below shows the number of shots she attempted in the number of games she played.

Shots Attempted	Number of Games
10	4
131	3
17	5
23	6
33	2

Find the mean number of shots that Christina attempted. Find the standard deviation of the shots attempted to the *nearest tenth*. What is the total number of games in which the number of shots attempted fell outside one standard deviation of the mean?

8 Mr. Truong gave his 25 final grades according to the following chart:

x_i	f_i
75	3
80	2
85	6
90	7
95	5
100	2

Find the standard deviation of this set of grades to the *nearest tenth*. What percentage of the grades fall *outside* one standard deviation of the mean?

9 The number of children of each of the first 41 United States presidents is given in the accompanying table. For this population, determine the mean and the standard deviation to the *nearest tenth*. How many of these presidents fall within one standard deviation of the mean?

Number of Children (x_i)	**Number of Presidents** (f_i)
0	6
1	2
2	8
3	6
4	7
5	3
6	5
7	1
8	1
10	1
15	1

10 In Australia, a study of farms with 30 or fewer sheep produced the following data.

Number of Sheep per Farm (x_i)	Number of Farms (f_i)
15	6
20	3
22	5
25	4
30	2

What is the mean for the number of sheep per farm? Find the standard deviation to the *nearest tenth*. What is the total number of farms that lie within one standard deviation of the mean?

11 The scores for the 20 students in the class are shown in the accompanying table.

Score	0	20	40	60	80	100
Frequency	3	1	2	4	8	2

Find the mean of this set of data. Find the standard deviation of this set of data to the *nearest tenth*. What percent of the scores fell within one standard deviation of the mean?

12 Find, to the *nearest tenth*, the standard deviation of the following data.

Measure (x_i)	Frequency (f_i)
20	4
21	2
24	5
26	3
30	6

The above data do *not* form a normal distribution. If a measure is selected at random from the above data, what is the probability that it will differ from the mean by less than one standard deviation?

13 The table below shows the heights of a group of 20 students.

Height (inches)	**Frequency**
72	3
71	2
70	1
69	2
68	4
67	2
66	4
65	2

Find the mean and the standard deviation to the *nearest tenth.* If one student's height is chosen at random, what is the probability that the height falls within one standard deviation of the mean? If three students' heights are chosen at random, what is the probability that *at most* one of them falls within one standard deviation of the mean?

14 The table below shows the scores on a writing test in an English class.

x_i	f_i
95	4
85	13
75	11
70	6
65	2

Using the accompanying set of data, find both the mean and the standard deviation to the *nearest tenth.* What is the number of scores that fall within one standard deviation of the mean ($\bar{x} \pm 1\sigma$)? Find, to the *nearest tenth*, the percentage of scores in this set of data that are within one standard deviation of the mean. What is the number of scores that fall within two standard deviations of the mean ($\bar{x} \pm 2\sigma$)? Find the percentage of scores in this set of data that are within two standard deviations of the mean.

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Answer Section

1 ANS:
16.2, 10. The population standard deviation is 16.2. The mean of the scores is 157. The range of scores within one standard deviation of the mean is 140.8-173.2. Ten scores fall within this range.

REF: 060729b

2 ANS:
7.5, 9. $\sigma_x \approx 7.5$. Since the mean is 78.4, the relevant range is 70.9-85.9. Nine scores fall within this range.

REF: 080730b

3 ANS:
5.9, 7

REF: 069941siii

4 ANS:
2.6, 12

REF: 080240siii

5 ANS:
1.06, 32

REF: 060340siii

6 ANS:
5.17 84.46 ± 5.17

$79.29 - 89.63$

$5 + 7 + 5 = 17$

REF: 061538a2

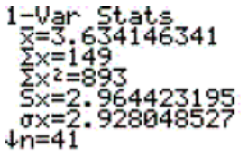
7 ANS:
18.4, 6.8, 6

REF: 010241siii

8 ANS:
7.1, 28

REF: 060241siii

9 ANS:



3.6, 2.9, 31. . The mean ≈ 3.6 and the standard deviation ≈ 2.9. One standard deviation within the mean represents a range of 0.7-6.5. 31 presidents had 1-6 children.

REF: 060630b

10 ANS:
21, 4.7, 12

REF: 068937siii

11 ANS:
59, 31.3, 70%

REF: 010441siii

12 ANS:
3.8, $\frac{2}{5}$

REF: 068536siii

13 ANS:
68.3, 2.3, $\frac{13}{20}$, $\frac{2254}{8000}$

REF: 089841siii

14 ANS:
79.4, 8.4, 24, 66.7, 36, 100

REF: 019842siii