

Final answers should have accuracy to 6 decimal places (or 4 decimal places for table-derived answers). Show some work how the mean and standard deviation are computed. *Giving only the answer will bring you few points.*

1. (18pts) A survey was conducted to determine how often students go home during the weekend over the course of a semester (among those who don't live at home). The number of visits is recorded below.

- Find the range of the number of visits.
- Find the mean of the number of visits.
- Find the standard deviation of the number of visits.

Number of visits	Frequency (students)
1	5
2	7
3	12
4	13
5	15
6	8
7	5
8	4
	<u>69</u>

a)  $8 - 1 = 7$

b)  $\frac{1 \cdot 5 + 2 \cdot 7 + 3 \cdot 12 + \dots + 8 \cdot 4}{5 + 7 + 12 + \dots + 4} = \frac{297}{69} = 4.304348$

c)  $5(1 - 4.304348)^2 + 7(2 - 4.304348)^2 + \dots + 4(8 - 4.304348)^2 = 234.60\dots$

$s = \sqrt{\frac{234.60\dots}{68}} = 1.857452$

2. (10pts) The amount paid for a certain type of car is normally distributed with mean \$22,000 and standard deviation \$1,000. Use the 68-95-99.7 rule (draw a picture) to find the percentage of buyers who paid:

- a) between \$22,000 and \$24,000

Area =  $\frac{0.95}{2} = 0.475 = 47.5\%$

- b) under \$21,000

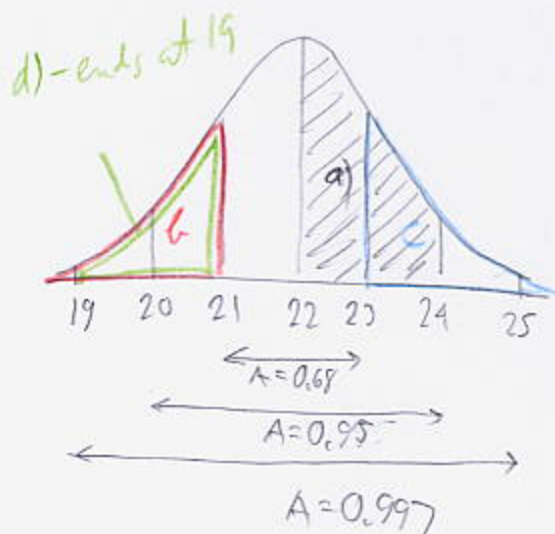
Area =  $0.5 - 0.34 = 0.16 = 16\%$

- c) over \$23,000

Symmetric picture with b, so 16%

- d) between \$19,000 and \$21,000

Area =  $\frac{0.997}{2} - 0.34 = 0.4985 - 0.34 = 0.1585 = 15.85\%$



3. (6pts) A set of data items is normally distributed with mean 45 and standard deviation 3.4. Find the data items that correspond to the z-scores given below.

a)  $z = 0$

$$x = 45$$

(mean)

b)  $z = 1.3$

$$x = 45 + 1.3 \cdot 3.4 = 49.42$$

c)  $z = -2.2$

$$x = 45 + (-2.2) \cdot 3.4 = 37.52$$

4. (4pts) John scored 34 points on an exam with mean 30 and standard deviation 3 and Jay scored 77 points on a similar exam with mean 70 and standard deviation 6. Use z-scores to determine who did better.

$$\text{John's } z = \frac{34-30}{3} = \frac{4}{3} = 1.333 \dots \leftarrow \text{higher above the mean, so better}$$

$$\text{Jay's } z = \frac{77-70}{6} = \frac{7}{6} = 1.16666$$

5. (22pts) A baker knows that the daily demand for apple pies normally distributed with mean 42.5 pies and standard deviation 4.6 pies. Draw a picture showing which area you are computing as you answer:

- On what percentage of days is the demand less than 45 pies?
- On what percentage of days is the demand greater than 44 pies?
- What is the percentile of the daily demand of 40 pies? What does this mean?
- What is the probability that on a random day the demand is between 38 and 44 pies?

