Spring '08/MAT 117/Worksheet 6 **Name:** Solution *Show all your work.*

(Final answers should have accuracy to 6 decimal places.)

1. (9pts) Every minute over the course of the hours 11AM-1PM, a bank employee counts the number of cars waiting in the drive-through bay. The table below shows his results.

a) Draw a histogram representing the data.

b) What is the mode of the data?

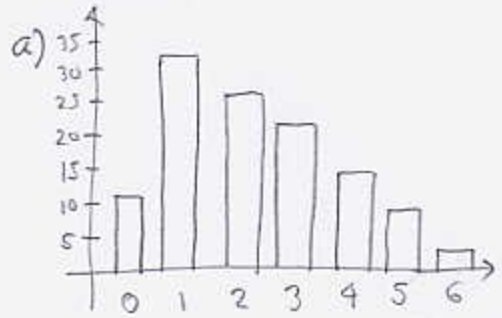
c) What is the median of the data?

d) What is the mean of the data?

e) Find the standard deviation of the data.

Cars	Freq.
0	11
1	33
2	26
3	22
4	16
5	9
6	3
	120

a)



b) The mode is 1 (most frequently occurring value)

need both 2

c) median: $0_{11}, 0, 1_{33}, 1, 2_{26}, 2, 3_{22}, 3, 4_{16}, 4, 5_{9}, 5, 6_{3}, 6$

$= \frac{2+2}{2} = 2$

d) $\mu = \frac{11\cdot 0 + 33\cdot 1 + 26\cdot 2 + 22\cdot 3 + 16\cdot 4 + 9\cdot 5 + 3\cdot 6}{120} = \frac{278}{120} = 2.316667$

e) $\sigma^2 = \frac{11(0-\mu)^2 + 33(1-\mu)^2 + 26(2-\mu)^2 + 22(3-\mu)^2 + 16(4-\mu)^2 + 9(5-\mu)^2 + 3(6-\mu)^2}{120} = \frac{279.\overline{6}}{120} = 2.33\overline{3}$

$\sigma = \sqrt{2.33\overline{3}} = 1.527434$

2. (6pts) Compute the following probabilities for a standard normal distribution. Draw a picture showing which area you are computing.

a) $P(-0.5 \le Z \le 0.33) = A_1 + A_2 = 0.1915 + 0.1293 = 0.3208$

b) $P(0.12 < Z) = A_1 - A_2 = 0.5 - 0.0478 = 0.4522$

3. (7pts) An entrepreneur interested in opening a hot dog stand is surveying foot traffic at a small square downtown. The table below shows the number of people present on the square at noon over the course of 28 days. Do the following:

a) Find the relative frequencies.

b) Draw a pie chart for the data (find angles first).

c) Enter a representative value for each interval.

d) Estimate the mean of the data.

Range	Frequency	a) Rel. Freq.	b) Angle	c) Rep. value
0–5	8	0.285714	103°	2.5
6–15	6	0.214286	77°	10.5
16–25	7	0.25	90°	20.5
26–35	5	0.178571	64°	30.5
36–50	2	0.071429	26°	43
	28			

b)

d) $\mu \approx \dfrac{8\cdot 2.5 + 6\cdot 10.5 + 7\cdot 20.5 + 5\cdot 30.5 + 2\cdot 43}{28} = \dfrac{465}{28} = 16.607143$

4. (8pts) According to the U.S. Bureau of the Census statistics, the ages of women who bore a child in 1992 were roughly normally distributed with mean 27.5 years old and a standard deviation of 6 years. Draw a picture showing which area you are computing as you answer:

a) Of the women who bore a child in 1992, what percentage was between 30 and 34?

b) Of the women who bore a child in 1992, what percentage was under 18?

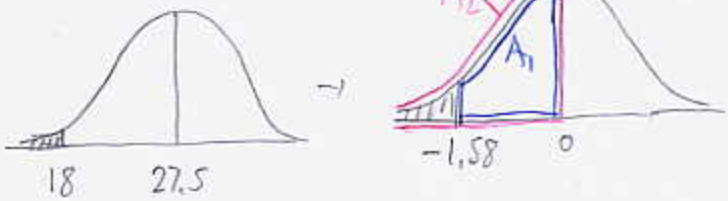
a) $P(30 \le X \le 34) = P\left(\frac{30-27.5}{6} \le Z \le \frac{34-27.5}{6}\right) = P(0.42 \le Z \le 1.08)$

$= A_2 - A_1$

$= 0.3599 - 0.1628$

$= 0.1971$, so 19.71%

b) $P(X < 18) = P\left(Z < \frac{18-27.5}{6}\right) = P(Z < -1.58) = A_2 - A_1$



$= 0.5 - 0.4429$

$= 0.0571$, so 5.71%