Midterm 1: Elementary Statistics

Unit 0

1. Answer:

- The sample size is 10;

- Mean heart rate= $\frac{59+60+70+75+75+75+76+77+77+78}{10} = 72.2\ beats\ per\ minute$

- Standard deviation= $\sqrt{\frac{\Sigma(xi-\mu)^2}{10-1}}$ =7.04

- One issue that affects its randomness is all these 10 students all had coffee; a more complete sample should include same amount of people who had coffees, and who doesn't have coffee, and different age; also it should have students from different grades, because students who are in higher grades may have more experience in final exams than those freshmen, their heart rates might be lower than freshmen.

2.

Whittier College

Fall of	Applied	Admitted	Enrolled	acceptance rate
2006	3120	1804	344	0.578205128
2007	2214	1485	312	0.670731707
2008	2206	1591	421	0.721214869
2009	2285	1638	359	0.716849015
2010	2900	2038	453	0.702758621
2011	2993	2139	427	0.714667558
2012	4125	2622	417	0.635636364
2013	4380	2771	446	0.632648402
2014	4850	3001	388	0.618762887
2015	5192	3267	445	0.629237288
2016	5146	3587	426	0.69704625
2017	5773	4277	520	0.740862636
2018	6220	4724	512	0.759485531
2019	7187	5369	493	0.747043273
Mean			425.928571	0.683224966
standard deviation				0.055762911

- Mean number of newly enrolled freshmen per year from 2006 – 2019 is 425.9.

- Average acceptance rate is 0.6832.

- Standard deviation of the acceptance rate is 0.055763.

- Time- series of acceptance rate:

Acceptance Rate
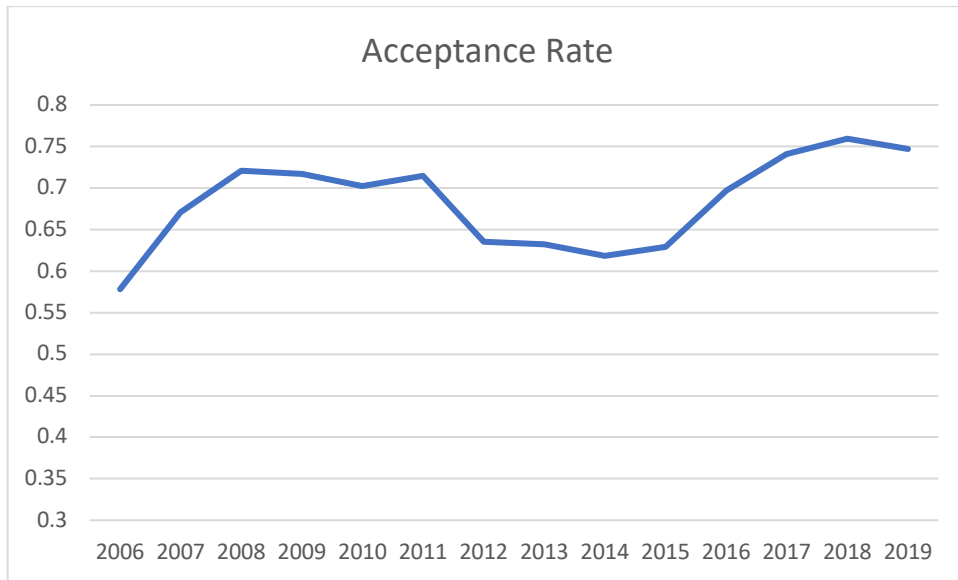
3. (a) the 75th percentile is $(151.00 + 170.00)/2 = 160.50$

    (b) 113.00 dollars correspond to 50th percentile.

    (c) mean of the data is 153.6; and the standard deviation is 61.966.

    (d) histogram:

Histogram (Frequency Diagram)
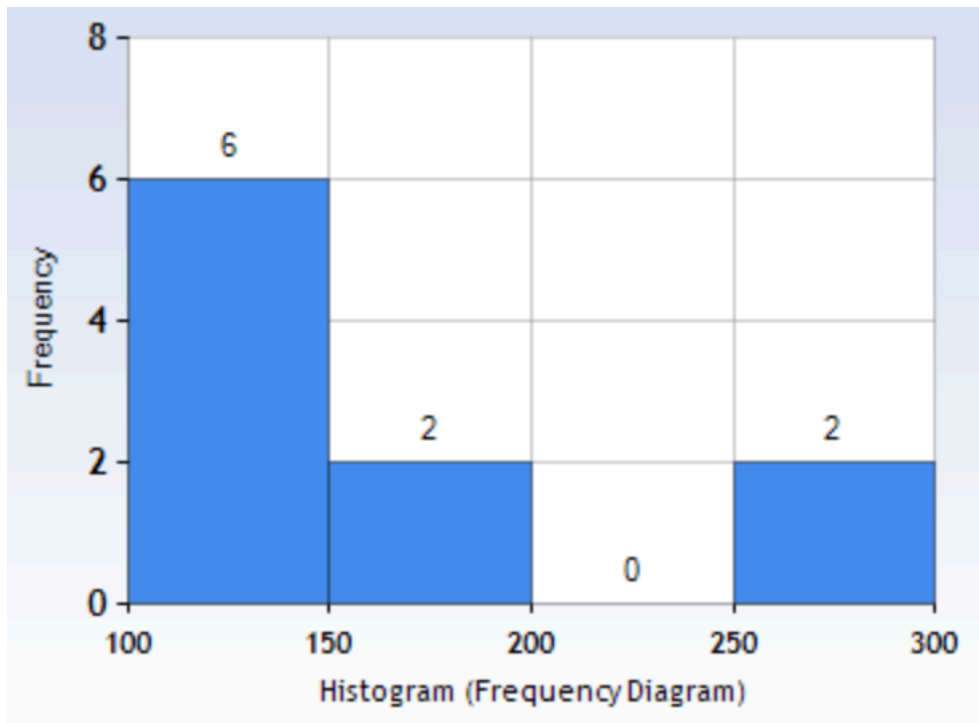
I notice that there is no stock price between $200 and $250.

4. (a) my dice is (1,1), there are two ones, so if it is true, there are three ones in other 6

dices. So the probability is $\frac{C_6^3}{6\times6\times6} = \frac{5}{54}$

(b) the probability is $\frac{1}{6\times6\times6\times6\times6\times6} = \frac{1}{46656}$

5. (a) the probability is $0.5^8 = \frac{1}{256}$

(b) the probability is $0.5^8 = \frac{1}{256}$

(c) these two are the same probability.

Unit 1

1. (1) the mean value of the stock is $\Sigma x \times p(x) = 90 \times 0.01 + 16 \times 0.49 +$
$(-15) \times 0.49 + (-95) \times 0.01 = \$0.44$

(2) the profit of 1000 shares is $0.44 * 1000= \$440$.

2. (a)

x	N good	P(x)	X*p(x)
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	1	0.1	0.4
5	0	0	0
6	3	0.3	1.8
7	6	0.6	4.2
8	0	0	0
9	0	0	0
10	0	0	0

(b) the participants guessing are randomly. Because each person's choice is separately.

(c) the data follows binominal distribution, $\mu = \Sigma x \times p(x) = 0.4 + 1.8 + 4.2 = 6.4$