MAT 035, Paper Test #3, Spring 2017 Name KEY

Instructions: Show all work or you will not receive full credit. Provide exact, fully-reduced answers, unless specifically asked to round. Be sure to provide complete explanations, and answer all parts of each question.

1. Organize the data below on ice cream preference and gender into a two-way table. (8 points)

1	2	3	4	5	6	7	8	9	10
Vanilla	Strawberry	Chocolate	Vanilla	Strawberry	Chocolate	Vanilla	Vanilla	Chocolate	Strawberry
Male	Male	Male	Male	Male	Male	Male	Male	Female	Female
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Chocolate	Vanilla	Chocolate	Chocolate	Strawberry	Vanilla	Chocolate	Vanilla	Chocolate	Chocolate
Female	Female	Female	Female	Female	Female	Female	Female	Female	Female

	Vanilla	Strawberry	Chocolate	Total
Male	4	2	2	8
Female	3	2	7	12
Total	7	4	9	20

a. How many people in the sample are both male and like strawberry ice cream?

2

b. If a person was randomly selected from the sample, what is the probability they would like vanilla and be female?

$\frac{3}{20}$

c. If a person was random selected from the sample, what is the probability that they would be female given that they liked chocolate?

$\frac{7}{9}$

d. Are gender and ice cream preference independent in this sample?

$P(\text{male}) = \frac{8}{20}$ $P(\text{vanilla}) = \frac{7}{20}$ dependent

$P(\text{male} \& \text{vanilla}) = \frac{4}{20} \neq \frac{8}{20} \cdot \frac{7}{20}$ $\frac{1}{5} \neq \frac{7}{50}$

e. Considering only ice cream preferences, which flavor would be the "modal" flavor? (i.e. which flavor is most preferred in the sample?)

Chocolate

2. Use the dataset below, to answer the following questions.

8	11	12	16	17	20	20

a. Find the mean, median and mode. Round the mean to one decimal place. Does the model represent the middle of the dataset? (3 points)

mean $\bar{x} = 14.857$ or 14.9 mode = 20

Median $\tilde{x} = 16$

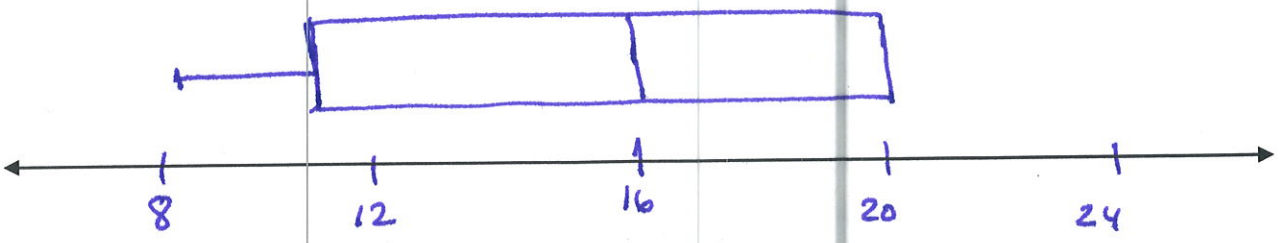
b. Find the five-number summary. (3 points)

min = 8 $Q_3 = 20$

$Q_1 = 11$ max = 20

Med = 16

c. Draw a boxplot. (3 points)



d. Find the standard deviation (2 points)

4.63

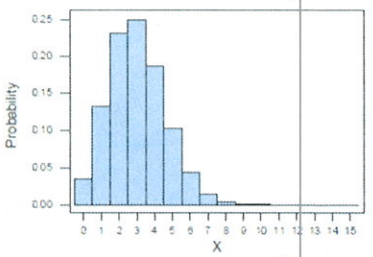
3. Create a stemplot for the data below. (3 points)

74	66	73	85	71	73	72	76	66	72
70	76	69	64	66	67	72	64	70	70

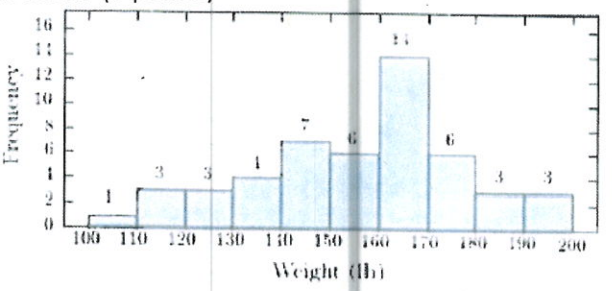
Note: If you have fewer than 5 stems, use a split-stem graph.

6	4 4
6	6 6 6 7 9
7	0 0 0 1 2 2 2 3 3 4
7	6 6
8	
8	5

4. Describe the shape of each distribution. (6 points)



right skewed



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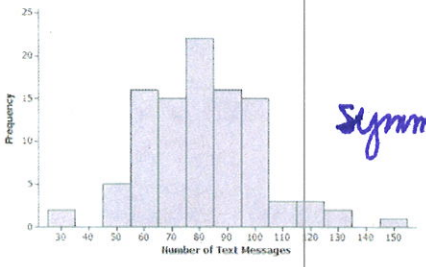
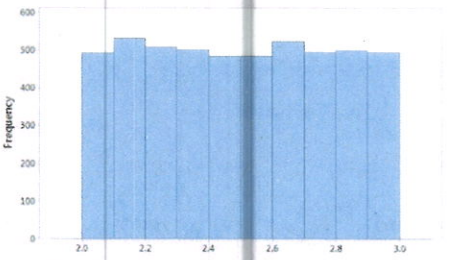
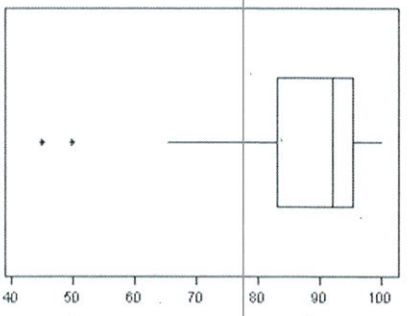


symmetric



uniform



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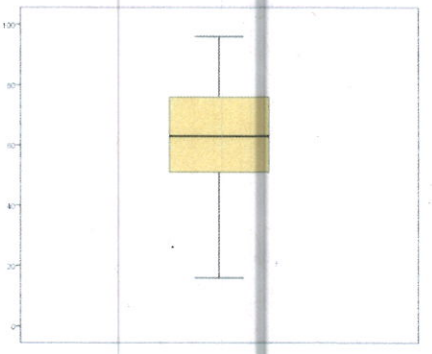
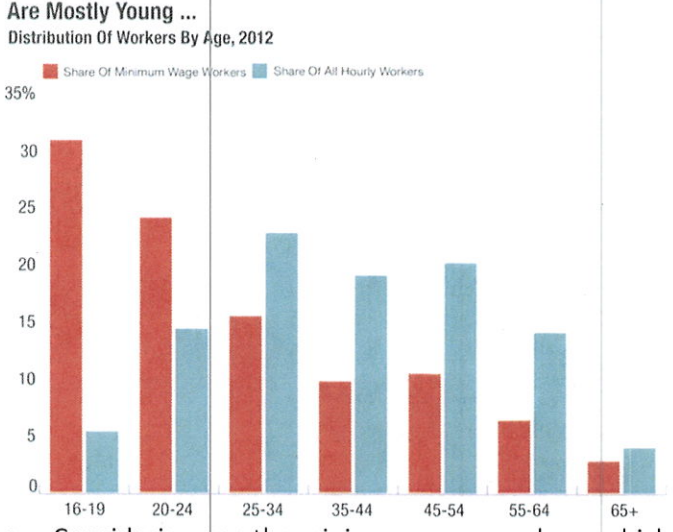


Symmetric

5. Use the graph below to answer the questions that follow. (3 points)



a. Considering one the minimum wage workers, which class (age group) is the modal class?

16-19

b. What percent of overall hourly workers are between the ages of 45 and 54?

20%

c. What percent of minimum wage workers are over the age of 35?

31%

6. Use the data set below to answer the questions that follow. (6 points)

72	72	73	80	81	82	87	88	89	90	93	93
96	98	99	100	102	103	104	104	104	105	106	107
107	107	111	111	111	111	112	112	114	115		

a. Find the percentile of the value 87.

$\frac{7}{34}$ = 20th percentile

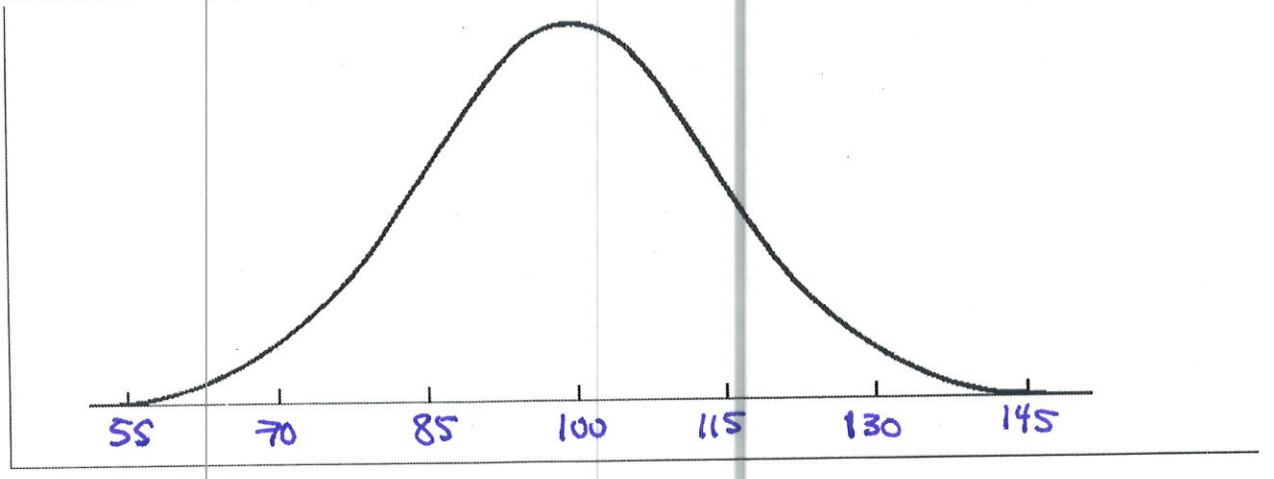
b. Find the percentile of the value 111.

$\frac{30}{34}$ = 88th percentile

c. What value corresponds to P_{35}?

.35 * 34 = 11.9 12th item

7. On the graph below, graph the normal distribution of IQ, with a mean of 100 and a standard deviation of 15. (3 points)



8. Women have a mean height of 64 inches in the US, with a standard deviation of 3 inches. Use this information to answer the questions below using the Empirical rule. (4 points)

a. What percentage of the population is between 58 inches and 70 inches?

$58 = 64 - 2(3)$
$70 = 64 + 2(3)$

95%

b. What percentage of the population is between 55 inches and 67 inches?

$\approx 83.85\%$

$100 - 16 - .15 =$

c. What percentage of the population is taller than 70 inches?

2.5%

d. What percentile of the population corresponds to a height of 61 inches?

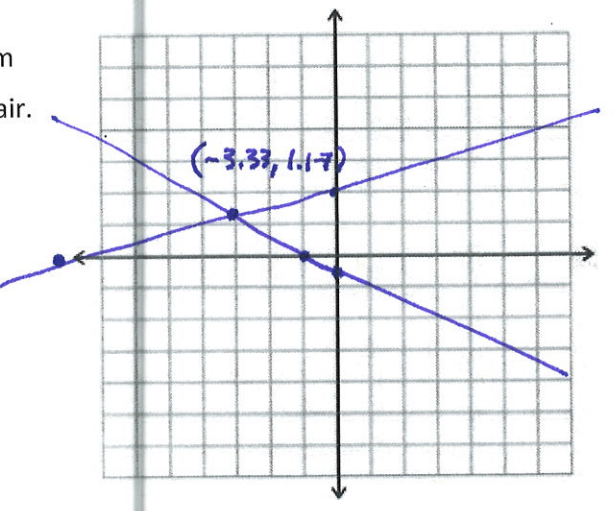
16th percentile

9. The mean score of the ACT is 21 with a standard deviation of 5. Pam scored 28 on the math portion of her test. The mean score of the SAT math portion is 500, with a standard deviation of 100. Tanya scored a 680 on this test. Who scored higher on their test? (Show math to justify your answer or you will receive no credit.) (4 points)

$\frac{28-21}{5} = 1.4$

$\frac{680-500}{100} = 1.8$ Tanya did better

10. Graph the system of equations and solve the system $\begin{cases} x - 4y = -8 \\ x + 2y = -1 \end{cases}$. Write the solution as an ordered pair. (3 points)



$\frac{-4y}{-4} = \frac{-x-8}{-4}$

$y = \frac{1}{4}x + 2$

$\frac{2y}{2} = \frac{-x-1}{2}$

$y = -\frac{1}{2}x - \frac{1}{2}$

$\left(-\frac{10}{3}, \frac{7}{6}\right)$

11. Solve the system $\begin{cases} 3x + 2y = 12 \\ x - 2y = 6 \end{cases}$ by substitution. (3 points)

$x = 2y + 6$

$3(2y+6) + 2y = 12$

$6y + 18 + 2y = 12$

$8y + 18 = 12$

$8y = -6$

$y = -\frac{3}{4}$

$x = 2(-\frac{3}{4}) + 6 = 9/2$

$(9/2, -3/4)$

12. You invest \$500 in a savings account earning 4% interest compounded monthly. How much money is in the account after 2.5 years? (3 points)

$500(1 + \frac{.04}{12})^{30} = \$552.49$

13. The cost of building the first new skateboard in a factory is \$1540. The cost of producing 80 new skateboards is \$4700. Find a linear equation that models the cost of producing x skateboards. (3 points)

$(1, 1540)$

$(80, 4700)$

$\frac{4700 - 1540}{79} = 40$

$y = 40x + 1500$