

STATISTICS HOMEWORK

Refer to the following table for Questions 1, 2, and 3.

The table shows temperatures on the first 12 days of October in small town in Maryland.

DATE	Temperature	DATE	Temperature	DATE	Temperature
Oct 1	73	Oct 5	53	Oct 9	62
Oct 2	66	Oct 6	53	Oct 10	49
Oct 3	66	Oct 7	62	Oct 11	52
Oct 4	70	Oct 8	55	Oct 12	57

- Determine the five number summary for this data.
  - Determine the mean temperature.
  - Determine the mode(s), if any.
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Refer to the following situation for Questions 4, 5, and 6.

Consider the following distribution by age groups.

AGE	FREQUENCY	RELATIVE FREQUENCY
10-14		0.04
15-19		
20-24	10	
25-29	6	
30-34	5	
35-39	4	
40-44	2	
45-49	1	
TOTAL	50	1.00

- Complete the table.
  - Is this distribution bell-shaped, skewed to the left, or skewed to the right? Explain your answer.
  - In what age range is the median? Explain your answer.
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7. Your entire gold coin collection consists of 5 coins. Their weights are 2, 3, 8, 7, and 6 oz. respectively. Find the standard deviation of their weights. Show all work.
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Refer to the following information for Questions 8 and 9.

In a recent survey, participants were asked which Apple products influenced them the most.

	IPOD	IPHONE	IPAD	TOTAL
Age under 20	70	100	130	300
Age 20-40	160	140	90	390
Age over 40	190	110	50	350
Total	420	350	270	1040

- What is the probability that the participant was aged 20-40 *or* was influenced by iPad the most?
  - What is the probability that the participant was influenced by iPod the most, given that the participant is aged under 20?
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Refer to the following information for Questions 10 and 11.

A club has 30 members.

10. How many different ways are there to assign the roles of President, Vice President, and Treasurer?  
11. How many different committees of size 4 can be formed?
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12. The Island Club is holding a fund-raising raffle. Ten thousand tickets have been sold for \$2 each. There will be a first prize of \$3,000, three second prizes of \$1,000 each, five third prizes of \$500 each, and 20 consolation prizes of \$100 each. What are the expected net winnings? Interpret your answer.

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Questions 13 and 14 involve the random variable  $x$  with probability distribution given below.

$x$	-2	4	5	6	7
$P(x)$	0.15	0.05	0.3	0.1	0.4

13. Determine the expected value of  $x$ .  
14. Determine the standard deviation of  $x$ .
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Questions 15, 16, and 17 involve the following situation.

**A random variable  $X$  is binomial with  $n = 15$  and  $p = 0.2$ .**

15. What is the probability that  $X=4$ ?  
16. What is the probability that  $X$  is at least 2?  
17. What is the expected value of  $X$ ? What is the standard deviation of  $X$ ?
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Refer to the following information for Questions 18, 19, 20, and 21.

**The weights of the 100 boys in Boy Scout Troop 829 are normally distributed with a mean of 170 pounds and a standard deviation of 5 pounds.**

18. What is the probability that a boy picked at random weighs less than 165 pounds?  
19. How many boys would you expect to weigh between 161 and 173 pounds?  
20. Find the 96<sup>th</sup> percentile.  
21. Find the cutoff values which represents the middle 80% of their weights.
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Refer to the following information for Questions 22, and 23.

**A random sample of 94 light bulbs had a mean life of  $\bar{x} = 587$  hours. The standard deviation of the lifetime of all such light bulbs is of  $\sigma = 36$  hours.**

22. Construct a 90% confidence interval estimate of the mean life,  $\mu$ , of all light bulbs of this type.  
23. It was expected that the mean lifetime of the light bulbs was 600 hours. Do the results contradict expectations? Explain your answer.
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24. Consider the hypothesis test given by

$$H_0 : \mu = 50$$

$$H_1 : \mu > 50$$

In a random sample of 100 subjects, the sample mean is found to be  $\bar{x} = 53.4$ . Also, the population standard deviation is  $\sigma = 8$

Determine the  $P$ -value for this test. Is there sufficient evidence to justify the rejection of  $H_0$ ? Explain.

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**25.** We perform the following hypothesis test of proportion of successes in a population.

$$H_0 : p = 0.7 \text{ vs. } H_2 : p < 0.7.$$

In a sample of 100 items, we discover 63 successes.

What is the conclusion at the  $\alpha = 0.05$  level? Explain your answer.

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**26.** Given a sample size of 18, with sample mean 660.3 and sample standard deviation 95.9, we perform the following hypothesis test.

$$H_0 : \mu = 700$$

$$H_1 : \mu \neq 700$$

What is the conclusion of the test at the  $\alpha = 0.05$  level? Explain your answer.

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Use the data in the table to answer Questions 27 and 28.

x	3	1	4	4	5
y	2	-2	5	4	8

**27.** Find the equation of the regression line. Show all work.

**28.** Find the predicted value of  $y$  when  $x = 4$ .

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**29.** A worker in an insurance company processes claims. The distribution of the number of claims processed each day in a week of this worker's life is as follows.

Day	# of Claims
Monday	28
Tuesday	45
Wednesday	40
Thursday	23
Friday	29

The worker's boss thinks the worker's claims processing is sporadic and is not evenly distributed throughout the week. At the  $\alpha = 0.05$  level, is there sufficient evidence to conclude that the worker's claims processing is sporadic?

Show all work – include the hypotheses, the computation of the test statistic, state the critical value, and state the conclusion of the test.

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**30.** Below is a compilation of student distribution in our four statistics classes from the summer of 2009.

Course	STAT 200	STAT 225	STAT 230	STAT 250
Percentage	45.8	12.0	32.8	9.4

The enrollment report for the summer of 2011 is given as follows.

Course	STAT 200	STAT 225	STAT 230	STAT 250
Frequency	249	71	133	47

At the 1% significance level, do the data provide sufficient evidence to conclude that 2011's enrollment distribution differs from the 2009 distribution?

Show all work – include the hypotheses, the computation of the test statistic, state the critical value, and state the conclusion of the test.