1) D
2) A
3) D
4) \( H_0: p = 0.03, H_1: p > 0.03 \). Test statistic: \( z = 1.57 \). P-value: \( p = 0.0582 \).
   Critical value: \( z = 2.33 \). Fail to reject null hypothesis. There is not sufficient evidence to warrant rejection of the
   manager's claim that production is not really out of control.
5) C
6) D
7) A
8) B
9) B
10) C
Answer Key
Testname: QUIZ 3 MATH 112

1) C
2) B
3) B
4) D
5) B
6) 
7) B
8) D
9) H₀: p = 0.03. H₁: p > 0.03. Test statistic: z = 1.57. P-value: p = 0.0582.
   Critical value: z = 1.28. Fail to reject null hypothesis. There is not sufficient evidence to warrant rejection of the
   manager’s claim that production is not really out of control.

10) D
Express the null hypothesis $H_0$ and the alternative hypothesis $H_1$ in symbolic form. Use the correct symbol ($\mu$, $p$, $\sigma$) for the indicated parameter.

1) A cereal company claims that the mean weight of the cereal in its packets is at least 14 oz.

A) $H_0: \mu < 14$  
B) $H_0: \mu = 14$  
C) $H_0: \mu = 14$  
D) $H_0: \mu > 14$  
H$_1$: $\mu \geq 14$  
H$_1$: $\mu > 14$  
H$_1$: $\mu < 14$  
H$_1$: $\mu \leq 14$

2) A researcher claims that the amounts of acetaminophen in a certain brand of cold tablets have a standard deviation different from the $\sigma = 3.3$ mg claimed by the manufacturers.

A) $H_0: \sigma = 3.3$ mg  
B) $H_0: \sigma < 3.3$ mg  
C) $H_0: \sigma = 3.3$ mg  
D) $H_0: \sigma > 3.3$ mg  
H$_1$: $\sigma \neq 3.3$ mg  
H$_1$: $\sigma < 3.3$ mg  
H$_1$: $\sigma > 3.3$ mg  
H$_1$: $\sigma = 3.3$ mg

3) A psychologist claims that more than 4.1 percent of the population suffer from professional problems due to extreme shyness. Use $p$, the true percentage of the population that suffers from extreme shyness.

A) $H_0: p = 4.1\%$  
B) $H_0: p < 4.1\%$  
C) $H_0: p > 4.1\%$  
D) $H_0: p = 4.1\%$  
H$_1$: $p < 4.1\%$  
H$_1$: $p > 4.1\%$  
H$_1$: $p \geq 4.1\%$  
H$_1$: $p \leq 4.1\%$

Find the value of the test statistic $z$ using $z = \frac{p - P}{\sqrt{\frac{PQ}{n}}}$.

4) A claim is made that the proportion of children who play sports is less than 0.5, and the sample statistics include $n = 1933$ subjects with 30% saying that they play a sport.

A) 35.90  
B) -35.90  
C) 17.59  
D) -17.59

Use the given information to find the P-value.

5) The test statistic in a right-tailed test is $z = 0.52$.

A) 0.1950  
B) 0.3015  
C) 0.5530  
D) 0.1915

A-1
6) A psychologist claims that more than 4.2 percent of the population suffers from professional problems due to extreme shyness. Identify the type I or type II error for the test.

A) The error of rejecting the claim that the true proportion is at most 4.2 percent when it really is at most 4.2 percent.
B) The error of rejecting the claim that the true proportion is more than 4.2 percent when it really is more than 4.2 percent.
C) The error of failing to reject the claim that the true proportion is at most 4.2 percent when it is actually more than 4.2 percent.

Use the given information to find the P-value.

7) The test statistic in a two-tailed test is $z = 1.95$.

A) 0.3415   B) 0.0512   C) 0.0244   D) 0.4423

Assume that the data has a normal distribution and the number of observations is greater than fifty. Find the critical value used to test a null hypothesis.

8) $\alpha = 0.05$ for a two-tailed test.

A) ±1.645   B) ±2.575   C) ±1.764   D) ±1.96

Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

9) A manufacturer considers his production process to be out of control when defects exceed 3%. In a random sample of 85 items, the defect rate is 5.9% but the manager claims that this is only a sample fluctuation and production is not really out of control. At the 0.01 level of significance, test the manager's claim.
Find the P-value for the indicated hypothesis test.

10) In a sample of 88 children selected randomly from one town, it is found that 8 of them suffer from asthma. Find the P-value for a test of the claim that the proportion of all children in the town who suffer from asthma is equal to 11%.

A) 0.2157  B) -0.2843  C) 0.2843  D) 0.5686