

## CHOOSING THE RIGHT HYPOTHESIS TEST

Statistics students must learn several different hypothesis tests. Beyond mastering individual tests, there is also a separate skill of being able to choose the right test to use. This can be done using information in the problem. The following table summarizes the tests.

Section	Name	Compares	Notes
9.4	One Mean $z$ -test	Mean $\mu$ to constant $\mu_0$	Use $z$ for $\sigma$ known
9.5	One Mean $t$ -test	Mean $\mu$ to constant $\mu_0$	Use $t$ for $\sigma$ unknown
10.3	Two Sample $t$ -test	Two means $\mu_1$ and $\mu_2$	Pooled if $\sigma_1 = \sigma_2$
10.5	Paired $t$ -test	Two means $\mu_1$ and $\mu_2$	Use $t$ -test on differences
12.2	One Proportion $z$ -test	Proportion $p$ to constant $p_0$	
12.3	Two Proportion $z$ -test	Two proportions $p_1$ and $p_2$	
13.4	Chi-Square Test	Multiple distributions	
16.3	Analysis of Variance	Multiple means $\mu_1, \mu_2, \dots$	

### Exercises:

For the following questions, choose the best test to use. The answers are on the back side.

A	One Mean Test	E	Two Proportions Test
B	Two Mean Test	F	Chi-Square Test
C	Test for Matched Pairs	G	Analysis of Variance
D	One Proportion Test		

1. Do Penn State graduates earn more than \$50000 per year?
2. Do men vote at a higher rate than women?
3. Are millennials taller than baby boomers?
4. Do more than 20% of Pittsburgh residents have a college degree?
5. Do husbands and wives have the same heights?
6. Is there a difference in the distribution of blood types for men and women?
7. Does the average cat weigh more than 10 pounds?
8. Do residents of Pennsylvania, Ohio, and Michigan have the same annual income?
9. Are cats and dogs adopted from a shelter at the same rate?
10. Do Penn State students sleep more than Ohio State students?
11. Do people have the same amount of pain before and after taking a drug?
12. Do trucks built by Ford, Chevy, and Ram last the same time before breaking down?
13. Do Pennsylvania voters approve of the President's handling of the economy?
14. Do students in different majors have different grade distributions in statistics?
15. Do residents of Blair County have longer commutes than residents of Centre County do?
16. Can the average citizen pass a citizenship test?
17. Do self-driving cars have fewer accidents than cars driven by people?
18. Does the Toyota Camry get more than 30 MPG?
19. Do the same items have the same prices at Wal-Mart and Target?
20. Do men check the time more often than women do?
21. Is there a difference in the GPAs of students in different majors?
22. Do Penn State students eat more than 2500 calories per day?
23. Do democrats, republicans, and independents have the same unemployment rate?
24. Do identical twins have the same incomes?

**Answers:**

1	A	5	C	9	E	13	D	17	E	21	G
2	E	6	F	10	B	14	F	18	A	22	A
3	B	7	A	11	C	15	B	19	C	23	F
4	D	8	G	12	G	16	D	20	F	24	C