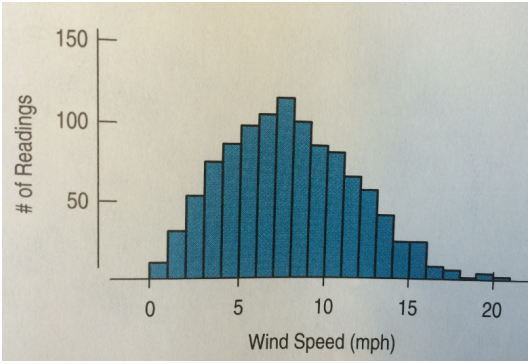
CHOOSE THE HYPOTHESIS TEST

Should you generate electricity with your own personal wind turbine? That depends on whether you have enough wind on your site. To produce enough energy, your site should have an annual average wind speed above 8 mph. One candidate site was monitored for a year, with speeds recorded every 6 hours. A total of 1114 readings of wind speed averaged 8.019 mph with a standard deviation of 3.813 mph. What would you tell the landowner about whether this site is suitable for a small wind turbine? Test an appropriate hypothesis.

Histogram of data:



One sample mean t-test

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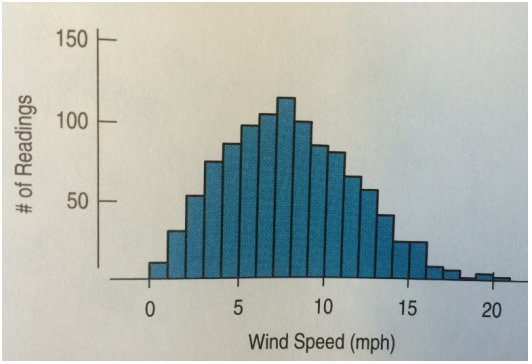

A magazine is considering the launch of an online edition. The magazine plans to go ahead only if it's convinced that more than 25% of current readers would subscribe. The magazine contacted a simple random sample of 500 current subscribers, and 137 of those surveyed expressed interest. What should the company do? Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied.

One-proportion test

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Do customers spend more on a trip to Walmart or Target? Suppose researchers interested in this question collected a systematic sample from 85 Walmart customers and 80 Target customers by asking customers for their purchase amount as they left the stores. The data collected is summarized in the table below. Test an appropriate hypothesis and state your conclusion.

	Walmart	Target
n	85	80
$\bar{x}$	$45	$53
s	$21	$19

Independent samples t-test

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Researchers at the National Cancer Institute released the results of a study that investigated the effects of 827 dogs from homes where an herbicide was used on a regular basis, diagnosing malignant lymphoma in 473 of them. Of the 130 dogs from homes where no herbicides were used, only 19 were found to have lymphoma. Is there a different rate of cancer in dogs between homes that use the herbicide and homes that do not? Test an appropriate hypothesis using a type I error rate of 5%.

Two-proportion test

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A presidential candidate fears he has a problem with women voters. His campaign staff runs a poll to assess the situation. They randomly sample 300 men and 300 women, asking if they have a favorable impression of the candidate. They find that 59% of the men and 53% of the women have positive images of the candidate. Is there is difference in impression between all men and all women voters? Test an appropriate hypothesis with a type I error rate of 1%.

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A garden center wants to store leftover packets of vegetable seeds for sale the following spring, but the center is concerned that the seeds may not germinate at the same rate a year later. The manager finds a packet of last year's green bean seeds and plants them as a test. Although the packet claims a germination rate of 92%, only 171 of 200 test seeds sprout. Is this evidence that the seeds have lost viability during a year in storage? Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.

One-proportion test

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A company with a fleet of 1600 cars found that the emissions systems of 15 out of the 50 they tested failed to meet pollution control guidelines. Is this enough evidence that more than 20% of the fleet might be out of compliance? Test an appropriate hypothesis and state your conclusions.

One-proportion test

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Some students checked 6 bags of Doritos marked with a net weight of 28.3 grams. They carefully weighed the contents of each bag, recording the following weights: 29.2, 28.5, 28.7, 28.9, 29.1, 29.5.

- Test an appropriate hypothesis with a type I error rate of 5%.

One-sample mean t-test

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A study found that babies born at different times of the year may develop the ability to crawl at different ages. The author of the study suggested that these differences may be related to the temperature at the time the infant is 6 months old. The study found that 32 babies born in January crawled at an average age of 29.84 weeks, with a standard deviation of 7.08 weeks. Among 21 July babies, crawling ages averaged 33.64 weeks, with a standard deviation of 6.91 weeks. Conduct an appropriate hypothesis test, is this difference significant?

Independent samples t-test

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The University of Michigan survey of consumers asked a sample of Americans "Do you rate the government's economic policy as poor?" Participants responded Yes or No. They also collected information on whether the participants only had high school diplomas (n = 140), or if they had college degrees (n = 87). Of those with high school diplomas, 70 said "yes" to the policy question. Of those with college degrees 30 said "yes" to the question. Test an appropriate hypothesis with a type I error rate of 5%.

Two-Proportion test

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It has been shown that elderly people who owned dogs are less likely to need visits to their physicians. Here are hypothetical data tallying the number of doctor visits for elderly people who own and do not own dogs. Test whether there is any difference between the groups:

Dog Owners	Control Group
8	12
5	10
9	6
4	9
6	15
	12
	14

Independent samples t-test

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In 2009, a national vital statistics report indicated that about 3% of all births produced twins. Is the rate of twin births the same among very young mothers? Data from a large city hospital found that only 7 sets of twins were born to 469 teenage girls. Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.

One-proportion test

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