

1. Which of the following are true statements?
 - I. The P -value of a test is the probability of obtaining a result as extreme as the one obtained assuming the null hypothesis is true.
 - II. If the P -value for a test is .015, the probability that the null hypothesis is true is .015.
 - III. When the null hypothesis is rejected, it is because it is not true.
 - (A) I only
 - (B) II only
 - (C) III only
 - (D) I and III
 - (E) None of the above gives the complete set of true responses.
2. A coffee-dispensing machine is supposed to deliver 8 ounces of liquid into each paper cup, but a consumer believes that the actual amount is less. As a test he plans to obtain a sample of 36 cups of the dispensed liquid and, if the mean content is less than 7.75 ounces, to reject the 8-ounce claim. If the machine operates with a standard deviation of 0.9 ounces, what is the probability that the consumer will mistakenly reject the 8-ounce claim even though the claim is true?
 - (A) .0475
 - (B) .0950
 - (C) .1500
 - (D) .3897
 - (E) .4525
3. Which of the following are true statements?
 - I. Tests of significance (hypothesis tests) are designed to measure the strength of evidence against the null hypothesis.
 - II. A well-planned test of significance should result in a statement either that the null hypothesis is true or that it is false.
 - III. The alternative hypothesis is one-sided if there is interest in deviations from the null hypothesis in only one direction.
 - (A) I and II
 - (B) I and III
 - (C) II and III
 - (D) I, II, and III
 - (E) None of the above gives the complete set of true responses.
4. A government statistician claims that the mean monthly rainfall along the Liberian coast is 15.0 inches with a standard deviation of 12.0 inches. A meteorologist plans to test this claim with measurements over 3.5 years (42 months). If she finds a sample mean more than 2.0 inches different from the claimed 15.0 inches, she will reject the government statistician's claim. What is the probability that the meteorologist will mistakenly reject a true claim?
 - (A) .0675
 - (B) .1401
 - (C) .2802
 - (D) .4325
 - (E) .8650
5. Which of the following are true statements?
 - I. The alternative hypothesis is stated in terms of a sample statistic.
 - II. A large P -value indicates strong evidence against the null hypothesis.
 - III. If a sample is large enough, the necessity for it to be a simple random sample is diminished.
 - (A) I only
 - (B) II only
 - (C) III only
 - (D) Exactly two of the above statements are true.
 - (E) None of the above statements are true.
6. An automotive company executive claims that a mean of 48.3 cars per dealership are being sold each month. A major stockholder believes this claim is high and runs a test by sampling 30 dealerships. What conclusion is reached if the sample mean is 45.4 cars with a standard deviation of 15.4?
 - (A) There is sufficient evidence to prove the executive's claim is true.
 - (B) There is sufficient evidence to prove the executive's claim is false.
 - (C) The stockholder has sufficient evidence to reject the executive's claim.
 - (D) The stockholder does not have sufficient evidence to reject the executive's claim.
 - (E) There is not sufficient data to reach any conclusion.
7. A pharmaceutical company claims that a medication will produce a desired effect for a mean time of 58.4 minutes. A government researcher runs a hypothesis test of 250 patients and calculates a mean of $\bar{x} = 59.5$ with a standard deviation of $s = 8.3$. In which of the following intervals is the P -value located?
 - (A) $P < .01$
 - (B) $.01 < P < .025$
 - (C) $.025 < P < .05$
 - (D) $.05 < P < .10$
 - (E) $P > .10$
8. A dentist believes that brand C toothpaste is better than brand P toothpaste. She asks 30 of her patients to use each brand and records the numbers of cavities observed over a 3-year period. She plans to reject any equality claim if the average number of cavities for brand C users is at least 1 fewer than the average for brand P users. If the standard deviation in cavities per person for

each brand is 2.3, what is the probability the dentist will mistakenly reject a correct null hypothesis of equality?

- (A) .0087
- (B) .0233
- (C) .0465
- (D) .5940
- (E) There is insufficient information given to calculate this probability.

9. To test which of two fuel additives results in better gas mileage, the average miles per gallon is noted when 40 cars are run for 1 week using the first additive, and then the average miles per gallon is calculated for the same 40 cars when they are run for another week. What is the conclusion at a 10% significance level if a two-sample hypothesis test, $H_0: \mu_1 - \mu_2 = 0$, $H_a: \mu_1 - \mu_2 \neq 0$, results in a P -value of .25?

- (A) The observed difference in miles per gallon is significant.
- (B) The observed difference in miles per gallon is not significant.
- (C) A conclusion is not possible without knowing the mean miles per gallon obtained using each additive.
- (D) A conclusion is not possible without knowing both the mean and the standard deviation resulting from the use of each additive.
- (E) A two-sample hypothesis test should not be used in this example.

10. A building inspector believes that the percentage of new construction with serious code violations may be even greater than the previously claimed 7%. She conducts a hypothesis test on 200 new homes and finds 23 with serious code violations. Is this strong evidence against the .07 claim?

- (A) Yes, because the P -value is .0062.
- (B) Yes, because the P -value is 2.5.
- (C) No, because the P -value is only .0062.
- (D) No, because the P -value is over 2.0.
- (E) No, because the P -value is .045.

11. A survey of 1000 Canadians reveals that 585 believe that there is too much violence on television. In a survey of 1500 Americans, 780 believe that there is too much television violence. To test at the 5% significance level whether or not the data are significant evidence that the proportion of Canadians who believe that there is too much violence on television is not equal to the proportion of Americans who believe that there is too much violence on television, a student sets up the following: $H_0: p = .585$ and $H_a: p \neq .585$, where p is the proportion of Americans who believe there is too much violence on television. Which of the following is a true statement?

- (A) The student has set up a correct hypothesis test.
- (B) Given the sample sizes, a 1% significance level would be more appropriate.
- (C) Given that $\frac{780}{1500} = .52$, $H_a: p < .585$ would be more appropriate.
- (D) Given that $\frac{585+780}{1000+1500} = .546$, $H_0: p = .546$ would be more appropriate.
- (E) A two-population difference in proportions hypothesis test would be more appropriate.

12. A geneticist claims that four species of fruit flies should appear in the ratio 1:3:3:9. Suppose that a sample of 4000 flies contained 226, 764, 733, and

2277 flies of each species, respectively. At the 10% significance level, is there sufficient evidence to reject the geneticist's claim?

- (A) The test proves the geneticist's claim.
 - (B) The test proves the geneticist's claim is false.
 - (C) The test does not give sufficient evidence to reject the geneticist's claim.
 - (D) The test gives sufficient evidence to reject the geneticist's claim.
 - (E) The test is inconclusive.
13. A medical researcher tests 640 heart attack victims for the presence of a certain antibody in their blood and cross-classifies against the severity of the attack. The results are reported in the following table:

		Severity of attack		
		Severe	Medium	Mild
Antibody test	Positive test	85	125	150
	Negative test	40	95	145

Is there evidence of a relationship between presence of the antibody and severity of the heart attack? Test at the 5% significance level.

- (A) There is evidence that presence of the antibody causes more severe heart attacks.
 - (B) There is evidence that heart attacks cause the antibody to form.
 - (C) There is evidence of a relationship between presence of the antibody and occurrence of a heart attack.
 - (D) There is evidence of a relationship between presence of the antibody and severity of the heart attack.
 - (E) At the 5% significance level there is not sufficient evidence of any relationship.
14. A city spokesperson claims that the mean response time for arrival of a fire truck at a fire is 12 minutes. A newspaper reporter suspects that the response time is actually longer and runs a test by examining the records of 64 fire emergency situations. What conclusion is reached if the sample mean is 13.1 minutes with a standard deviation of 6 minutes?
- (A) The P -value is less than .001, indicating very strong evidence against the 12-minute claim.
 - (B) The P -value is .01, indicating strong evidence against the 12-minute claim.
 - (C) The P -value is .07, indicating some evidence against the 12-minute claim.
 - (D) The P -value is .18, indicating very little evidence against the 12-minute claim.
 - (E) The P -value is .43, indicating no evidence against the 12-minute claim.

15. It is believed that using a new fertilizer will result in a yield of 1.6 tons per acre. A botanist carries out a two-tailed test on a field of 64 acres. Determine the P -value if the mean yield per acre in the sample is 1.72 tons with a standard deviation of 0.4. What is the conclusion at a level of significance of 10%? 5%? 1%?
- (A) $P = .008$, and so the 1.6-ton claim should be disputed at all three of these levels.
- (B) $P = .02$, and so the 1.6-ton claim should be disputed at the 10% and 5% levels but not at the 1% level.
- (C) $P = .08$, and so the 1.6-ton claim should be disputed at the 10% level but not at the 5% and 1% levels.
- (D) $P = .02$, and so the 1.6-ton claim should be disputed at the 1% level but not at the 10% and 5% levels.
- (E) $P = .008$, and so there is not enough evidence to dispute the 1.6-ton claim at any of the three levels.

16. In an effort to curb certain diseases, especially autoimmune (AIDS), San Francisco has a program whereby drug users can exchange used needles for fresh ones. As reported in the *Journal of the American Medical Association* (January 12, 1994, p. 115), 35% of 5644 intravenous drug users in San Francisco admitted to sharing needles. Is this sufficient evidence to say that the rate of sharing needles has dropped from the pre-needle exchange rate of 66%?

- (A) $P < .001$, so this is very strong evidence that the rate has dropped.
- (B) $P = .0063$, so this is strong evidence of a drop in rate.
- (C) P is between .01 and .05, so there is moderate evidence of a drop in rate.
- (D) P is between .05 and .10, so there is some evidence of a drop in rate.
- (E) $P = .31$, so there is no real evidence of a drop in rate.

17. A recent study of health service costs for coronary angioplasty versus coronary artery bypass surgery at a London hospital (*The Lancet*, October 1, 1994, page 929) showed an average cost of £6176 with a standard deviation of £329 for 231 angioplasties and an average cost of £8164 with a standard deviation of £264 for 221 bypass surgeries. Is this sufficient evidence to say that the average cost of angioplasty is less than the average cost of bypass surgery?

- (A) $P < .001$, so this is very strong evidence that angioplasty costs less.
- (B) P is between .001 and .01, so this is strong evidence that angioplasty costs less.
- (C) P is between .01 and .05, so this is moderate evidence that angioplasty costs less.
- (D) P is between .05 and .10, so there is some evidence that angioplasty costs less.
- (E) $P > .10$, so there is little evidence that angioplasty costs less.

18. Amos Tversky and Thomas Gilovich, in their study on the "Hot Hand" in basketball (*Chance*, Winter 1989, page 20), found that in a random sample of games, Larry Bird hit a second free throw in 48 of 53 attempts after the first free throw was missed, and hit a second free throw in 251 of 285 attempts after the first free throw was made. Is there sufficient evidence to say that the probability that Bird will make a second free throw is different depending on whether or not he made the first free throw?

- (A) $P < .001$, so this is very strong evidence that the probability that Bird will make a second free throw is different depending on whether he made the first.
- (B) P is between .001 and .01, so this is strong evidence that the probabilities are different.
- (C) P is between .01 and .05, so this is moderate evidence that the probabilities are different.
- (D) P is between .05 and .10, so there is some evidence that the probabilities are different.
- (E) $P > .10$, so there is little or no evidence that the probabilities are different.

19. A study of accident records at a large engineering company in England (*The Lancet*, October 22, 1994, page 1137) reported the following number of injuries on each shift for 1 year:

Shift:	Morning	Afternoon	Night
Number of injuries:	1372	1578	1686

Is there sufficient evidence to say that the number of accidents on the three shifts are not the same? Test at the .05, .01, and .001 levels.

- (A) There is sufficient evidence at all three levels to say that the number of accidents on each shift are not the same.
- (B) There is sufficient evidence at both the .05 and .01 levels but not at the .001 level.
- (C) There is sufficient evidence at the .05 level but not at the .01 and .001 levels.
- (D) There is sufficient evidence at the .001 level but not at the .01 and .05 levels.
- (E) There is not sufficient evidence at any of these levels.
20. A 4-year study analyzing blood cholesterol in men more than 70 years old, reported in *The New York Times*, noted how many men with different cholesterol levels suffered a nonfatal or fatal heart attack.

	Low cholesterol	Medium cholesterol	High cholesterol
Nonfatal heart attacks	29	17	18
Fatal heart attacks	19	20	9

Is there evidence of a relationship? Does level of cholesterol seem to predict risk of heart disease for men more than 70 years old? Test at the 10% significance level.

- (A) At the 10% significance level, the given data prove that level of cholesterol predicts risk of heart disease for men more than 70 years old.
- (B) At the 10% significance level, the given data prove that level of cholesterol does not predict risk of heart disease for men more than 70 years old.

- (C) Since $3.018 < 4.61$, there is sufficient evidence at the 10% significance level of a relationship between cholesterol level and risk of heart disease for men more than 70 years old.
- (D) Since $3.018 < 4.61$, there is not sufficient evidence at the 10% significance level of a relationship between cholesterol level and risk of heart disease for men more than 70 years old.
- (E) Relationship and causation give contradictory conclusions in this problem.

21. Which of the following statements are true?

- I. It is helpful to examine your data before deciding whether to use a one-sided or a two-sided hypothesis test.
- II. If the P -value is .05, the probability that the null hypothesis is correct is .05.
- III. The larger the P -value, the more evidence there is against the null hypothesis.

- (A) I only
 (B) II only
 (C) III only
 (D) II and III

(E) None of the above gives the complete set of true responses.

22. A test is run to determine whether there is a difference in miles per gallon between two car models. A simple random sample of 40 autos of the first model and an independent simple random sample of 50 of the second model are available for the test. What is the probability of mistakenly claiming there is a difference when there isn't if the cutoff difference scores are ± 0.5 ? Assume standard deviations of 1.2 and 0.65 miles per gallon, respectively, for the two models.

- (A) .0045
 (B) .0089
 (C) .0178
 (D) .4911
 (E) .9822

23. A surprising study of 1437 male hospital admissions reported in *The New York Times* (February 24, 1993, page C12) found that, of 665 patients admitted with heart attacks, 214 had vertex baldness, while of the remaining 772 non-heart-related admissions, 175 had vertex baldness. Is this evidence sufficient at the 5% significance level to say that there is a relationship between heart attacks and vertex baldness?

- (A) Yes, because $\chi^2 = 4.05$, while the critical χ^2 is 3.84.
 (B) Yes, because $\chi^2 = 16.39$, while the critical χ^2 is 3.84.
 (C) No, because $\chi^2 = 16.39$, while the critical χ^2 is 3.84.
 (D) No, because $\chi^2 = 4.05$, while the critical χ^2 is 7.81.
 (E) Yes, because $\chi^2 = 16.39$, while the critical χ^2 is 7.81.

24. A local restaurant owner claims that only 15% of visiting tourists stay for more than 2 days. A chamber of commerce volunteer is sure that the real percentage is higher. He plans to survey 100 tourists and intends to speak up if at least 18 of the tourists stay longer than 2 days. What is the probability of mistakenly rejecting the restaurant owner's claim if it is true?

- (A) .0357
 (B) .0714
 (C) .1428
 (D) .2005
 (E) .4010

25. A geologist claims that a particular rock formation will yield a mean amount of 24 pounds of a chemical per ton of excavation. His company, fearful that the true amount will be less, plans to run a test on a random sample of 50 tons. They will reject the 24 pound claim if the sample mean is less than 22. Suppose the standard deviation between tons is 5.8 pounds. If the true mean is 20 pounds of chemical, what is the probability that the test will result in a failure to reject the incorrect 24 pound claim?

- (A) .0073
 (B) .4927
 (C) .5073
 (D) .8200
 (E) .9927

26. Is hair loss pattern related to body mass index? One study on 769 men (*Journal of the American Medical Association*, February 24, 1993, page 1000) showed the following numbers:

		Hair loss pattern		
		None	Frontal	Vertex
Body mass index	<25	137	22	40
	25-28	218	34	67
	>28	153	30	68

The χ^2 -value is 4.18. At the 5% and 10% significance levels is there a relationship between hair loss pattern and body mass index?

- (A) There is sufficient evidence of a relationship at both the 5% and 10% levels.
 (B) There is sufficient evidence of a relationship at the 5% level but not at the 10% level.
 (C) There is sufficient evidence of a relationship at the 10% level but not at the 5% level.
 (D) There is not sufficient evidence of a relationship at either the 5% or the 10% level.
 (E) There is not enough information to answer this question.

27. A highway superintendent states that five bridges into a city are used in the ratio 2:3:3:4:6 during the morning rush hour. A highway study of a simple random sample of 6000 cars indicates that 720, 970, 1013, 1380, and 1917 cars use the five bridges, respectively. Can the superintendent's claim be rejected at the 2.5% or 5% level of significance?

- (A) There is sufficient evidence to reject the claim at either of these two levels.
- (B) There is sufficient evidence to reject the claim at the 2.5% level but not at the 5% level.
- (C) There is sufficient evidence to reject the claim at the 5% level but not at the 2.5% level.
- (D) There is not sufficient evidence to reject the claim at either of these two levels.
- (E) There is not sufficient information to answer this question.

28. A factory manager claims that the plant's smokestacks spew forth only 350 pounds of pollution per day. A government investigator suspects that the true value is higher and plans a hypothesis test with a critical value of 375 pounds. Suppose the standard deviation in daily pollution poundage is 150 and the true mean is 385 pounds. If the sample size is 100 days, what is the probability that the investigator will mistakenly fail to reject the factory manager's false claim?

- (A) .0475
- (B) .2514
- (C) .7486
- (D) .7514
- (E) .9525

29. Is there a relationship between fitness level and smoking habits? A study reported in the *New England Journal of Medicine* (February 25, 1993, page 535) cross-classified individuals in four categories of fitness and four categories of smoking habits:

	Fitness level			
	Low	Medium	High	
Never smoked	113	113	110	159
Former smokers	119	135	172	190
1 to 9 cigarettes daily	77	91	86	65
≥ 10 cigarettes daily	181	152	124	73

The χ^2 -value is 87.6. Is there a relationship between fitness level and smoking habits?

- (A) The data prove that smoking causes lower fitness levels.
- (B) The data prove that lower fitness levels cause people to smoke.
- (C) There is sufficient evidence at the 0.1% significance level of a relationship between fitness level and smoking habits.

(D) There is sufficient evidence at the 1% level, but not at the 0.1% level, of a relationship between fitness level and smoking habits.

(E) There is sufficient evidence at the 10% level, but not at the 1% level, of a relationship between fitness level and smoking habits.

30. A building inspector inspects four major construction sites every day. In a sample 100 days, the number of times each site passed inspection was

Site:	A	B	C	D
Passed:	45	33	67	83

Test the hypothesis that sites C and D pass inspection twice as often as sites A and B, that is, that the frequency of passing inspection is in the ratio 1:1:2:2.

- (A) There is sufficient evidence at both the 10% and 5% significance levels that there is not a good fit with the indicated ratio.
- (B) There is sufficient evidence at the 10% level, but not at the 5% level, that there is not a good fit with the indicated ratio.
- (C) There is sufficient evidence at the 5% level, but not at the 10% level, that there is not a good fit with the indicated ratio.
- (D) There is not sufficient evidence at either the 10% or 5% significance levels that there is not a good fit with the indicated ratio.
- (E) There is not sufficient information to answer the question.

Almost Done!

1. Which of the following statements are true?
 - I. Like the normal, t -distributions are always symmetric.
 - II. Like the normal, t -distributions are always mound-shaped.
 - III. The t -distributions have less spread than the normal, that is, they have less probability in the tails and more in the center than the normal.

(A) II only
(B) I and II
(C) I and III
(D) II and III
(E) I, II, and III
2. Which of the following statements about t -distributions are true?
 - I. The greater the number of degrees of freedom, the narrower the tails.
 - II. The smaller the number of degrees of freedom, the closer the curve is to the normal curve.
 - III. Thirty degrees of freedom gives the normal curve.

(A) I only
(B) I and II
(C) I and III
(D) II and III
(E) I, II, and III
3. Statistical analysis using the t -distributions for small samples assumes which of the following?
 - I. Sample standard deviation equal to the population standard deviation
 - II. Random sampling
 - III. Normal population

(A) I only
(B) I and II
(C) I and III
(D) II and III
(E) I, II, and III
4. What is the critical t -value for finding a 90% confidence interval estimate from a sample of 15 observations?

(A) 1.341
(B) 1.345
(C) 1.350
(D) 1.753
(E) 1.761

5. In a one-sided hypothesis test for the mean, in a random sample of size 10 the t -score of the sample mean is 2.79. Is this significant at the 5% level? At the 1% level?
- (A) Significant at the 1% level but not at the 5% level
 (B) Significant at the 5% level but not at the 1% level
 (C) Significant at both the 1% and 5% levels
 (D) Significant at neither the 1% nor 5% level
 (E) Cannot be determined from the given information
6. Which of the following statements about matched pairs analysis are true?
- I. The two samples are assumed to be independent.
 II. One-sample procedures are applied to a set of differences.
 III. In a matched-pairs t -procedure, the population of differences is assumed to have a normal distribution.
- (A) I only
 (B) I and II
 (C) I and III
 (D) II and III
 (E) I, II, and III
7. In a sleep laboratory experiment, 16 volunteers sleep an average of 7.4 hours with a standard deviation of 1.3 hours. What is a 99% confidence interval estimate for the mean number of hours that people sleep at night? Assume the population has a normal distribution.
- (A) 7.4 ± 0.24
 (B) 7.4 ± 0.84
 (C) 7.4 ± 0.85
 (D) 7.4 ± 0.96
 (E) 7.4 ± 3.83
8. Acute renal graft rejection can occur years after the graft. In one study (*The Lancet*, December 24, 1994, page 1737), 21 patients showed such late acute rejection when the ages of their grafts (in years) were 9, 2, 7, 1, 4, 7, 9, 6, 2, 3, 7, 6, 2, 3, 1, 2, 3, 1, 1, 2, and 7, respectively. Establish a 90% confidence interval estimate for the ages of renal grafts that undergo late acute rejection.
- (A) 2.024 ± 0.799
 (B) 2.024 ± 1.725
 (C) 4.048 ± 0.799
 (D) 4.048 ± 1.041
 (E) 4.048 ± 1.725
9. Nine subjects, 87 to 96 years old, were given 8 weeks of progressive resistance weight training (*Journal of the American Medical Association*, June 13, 1990, page 3032). Strength before and after training for each individual was measured as maximum weight (in kilograms) lifted by left knee extension:
- | | | | | | | | | | |
|---------|---|-----|----|----|----|----|-----|------|----|
| Before: | 3 | 3.5 | 4 | 6 | 7 | 8 | 8.5 | 12.5 | 15 |
| After: | 7 | 17 | 19 | 12 | 19 | 22 | 28 | 20 | 28 |
- (A) 11.61 ± 3.03
 (B) 11.61 ± 3.69
 (C) 11.61 ± 3.76
 (D) 19.11 ± 1.25
 (E) 19.11 ± 3.69
10. An IRS representative claims that the average deduction for medical care is \$1250. A taxpayer who believes that the real figure is lower samples 12 families and comes up with a mean of \$934 and a standard deviation of \$616. Where is the P -value?
- (A) Below .01
 (B) Between .01 and .025
 (C) Between .025 and .05
 (D) Between .05 and .10
 (E) Over .10
11. An auditor remarks that the accounts receivable for a company seem to average about \$2000. A quick check of 20 accounts gives a mean of \$2250 with a standard deviation of \$600. Where is the P -value?
- (A) Below .01
 (B) Between .01 and .025
 (C) Between .025 and .05
 (D) Between .05 and .10
 (E) Over .10
12. Six capsules of drug A took an average of 75 seconds with a standard deviation of 1.4 seconds to dissolve, while the average time for six capsules of drug B was 71 seconds with a standard deviation of 1.7 seconds. Establish a 99% confidence interval estimate for the difference in dissolving time between the two brands (assuming we have normal distributions with equal variances.)
- (A) 4 ± 1.55
 (B) 4 ± 2.48
 (C) 4 ± 2.56
 (D) 4 ± 2.85
 (E) 4 ± 3.10
13. A researcher believes a new diet should improve weight gain in laboratory mice. If ten control mice on the old diet gain an average of 4 ounces with a standard deviation of 0.3 ounces, while the average gain for ten mice on the new diet is 4.8 ounces with a standard deviation of 0.2 ounces, where is the P -value?
- (A) Below .01
 (B) Between .01 and .025
 (C) Between .025 and .05
 (D) Between .05 and .10
 (E) Over .10
14. A simple random sample of 20 batteries are tested and show a mean life expectancy of 218 hours with a standard deviation of 11 hours. Determine a 90% confidence interval estimate for this mean life expectancy.

Find a 95% confidence interval estimate for the strength gain.

- (A) 218 ± 0.95
 - (B) 218 ± 3.27
 - (C) 218 ± 4.05
 - (D) 218 ± 4.25
 - (E) 218 ± 19.02
15. A catch of five fish of a certain species yielded the following ounces of protein per pound of fish: 3.1, 3.5, 3.2, 2.8, and 3.4. What is a 90% confidence interval estimate for ounces of protein per pound of this species of fish?
- (A) 3.2 ± 0.202
 - (B) 3.2 ± 0.247
 - (C) 3.2 ± 0.261
 - (D) 4.0 ± 0.202
 - (E) 4.0 ± 0.247
16. The 26 contestants in the pentathlon event of the 1992 Olympics ran the 200-meter dash in the following times (in seconds): 25.44, 24.39, 25.66, 23.93, 23.34, 25.01, 24.27, 24.54, 25.44, 24.86, 23.95, 23.31, 24.60, 23.12, 25.29, 24.40, 25.24, 24.43, 23.70, 25.20, 25.09, 24.48, 26.13, 25.28, 24.18, and 23.83 (*Journal of the American Statistical Association*, September 1994, page 1101). In testing the null hypothesis that the mean time required for pentathlon contestants to run this race is 25 seconds against the alternative hypothesis that the mean time required is less than 25 seconds, in which of the following intervals is the P -value located?
- (A) $P < .005$
 - (B) $.005 < P < .01$
 - (C) $.01 < P < .05$
 - (D) $.05 < P < .10$
 - (E) $.10 < P$