STAT 200 Final Exam Study Guide Questions for Post Exam 3 Material.

The Final is cumulative and all Multiple Choice. It will be about twice as long as a midterm.

To Study Exam 1-3 material--Review your graded Exams 1, 2 and 3.
Blank copies and keys are posted on our course website (see exam schedule page.)

To Study Post-Exam 3 material-- Do this Study guide as a Real exam without peeking at your notes.

Here's the only Formulas that will be given to you:

$$SD_{errors} = \sqrt{1-r^2} * SD_y$$

$$\mathbf{SE_{slope}} = \frac{SD_{errors}}{\sqrt{n} * SD_x} = \frac{\sqrt{1-r^2}}{\sqrt{n}} * \frac{SD_y}{SD_x}$$

$$SE_{R_A} = SE_{R_B} = SE_U = \sqrt{\frac{n_A n_B (N+1)}{12}}$$

$$H = \frac{12}{N(N+1)} \sum_{i=1}^{g} \frac{(obsR_i - expR_i)^2}{n_i}$$

$$SE_{r_s} = \frac{1}{\sqrt{n-1}}$$

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Question 1 On a past Stat 200 survey, **240** students answered the following 3 questions: What is your ACT score? How many drinks per week do you typically consume? And what % of your tuition are your parents paying? Here's the multiple regression equation predicting the percent tuition parents pay from ACT scores and # of drinks. (Assume the 240 students were randomly chosen from thousands of Stat 200 students.) $\widehat{\text{Tuition}} = -1 + 2.7(\text{ACT}) - 0.5(\text{Drinks})$

a) To test the overall regression effect, H_0:R=0 against H_A:R≠0 fill in the missing blanks in the ANOVA table. (

Source	SS (Round to nearest whole number)	df	MS (Round to 2 decimal places)	(Round to 2 decimal places)
Model	SSM= 28,393		MSM= _____	F=
Error	SSE=		MSE = _____	SD^+_{errors}=
Total	SST= 245,198		Nothing goes in this box.	R^2=

b) When the null is true you'd expect the F stat to be about _____ .

c) Comparing the F-stat you got in (a) to what you'd expect under the null (or by looking on the F-table) you can estimate the p-value to be   **i)** < 1%   **ii)** 1% to 5%   **iii)** 5% to 10%   **iv)** > 10%

d) Another way to compute the p-value is by the re-randomization test. The histogram on the right shows the randomization test results of 50,000 randomizations showing the distribution of R's.
What does the vertical line mark?
- **i.** the specified significance level α
- **ii.** the randomized R's that land at p-value = 0.5 %
- **iii.** the value of our sample R.

e) The p-value given by the randomization test is closest to ….
- i)   0
- ii)   1%
- iii)   5%
- iv)   not enough info
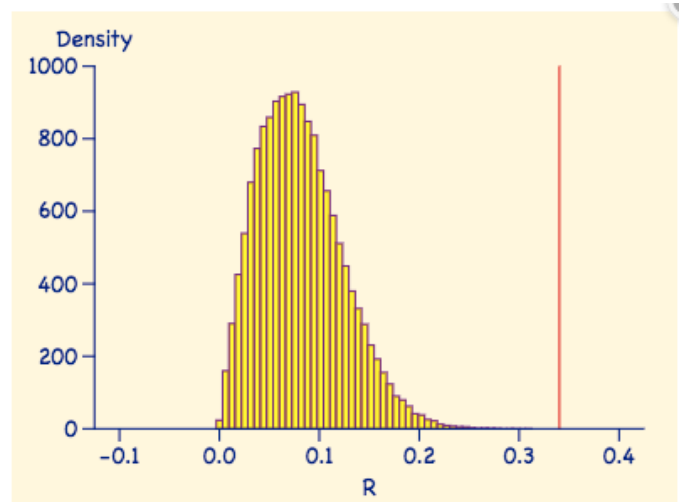
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Question 2 Suppose the Final Exam, quiz and lab scores of **33** randomly selected students from a large Physics class of 2000 students yielded the following multiple regression equation with **R= 0.5** $\hat{Final} = 50 + 0.3(Quiz) + 0.1(Lab)$

a) The above equation describes the best fitting _____ through all the points so as to minimize the squared errors in the _____.

Circle one for the 1ˢᵗ blank: **a)** line   **b)** plane   **c)** ellipsoid   **d)** cube
Circle one for the 2ⁿᵈ blank: **a)** Final Exam Scores   **b)** Quiz scores   **c)** Lab scores

b) The multiple regression equation for all students with Labs = 70 simplifies to $\hat{F}$ = _____ + _____ (**Quiz**)

c) The multiple regression equation predicts Doug to have a Final score of 70. If Alex scored 10 points higher than Doug on the quizzes and 20 points higher on the labs what's Alex's predicted Final score?_____

d) Do the F test for the overall regression effect for the model: $\hat{Final} = 50 + 0.3(Quiz) + 0.3(Lab)$ **R= 0. 5** and **n=33**
    $R^2 =$ _____ and 1- $R^2 =$ _____

F-test
Compute the F statistic. Show work. No work, no credit.
 Look at the F table. What is F*(the critical value of F) at $\alpha = 0.01$?   F* = _____   Our F test stat ____F* so our p-value is _____ than 1%.   Fill in the two blanks with either   <, >, or =

e) Suppose you decided to reject the null at $\alpha = 0.05$, you'd conclude that … Choose one:
  i) Both slopes must be significant.   ii)The Quiz slope must be significant.   iii) The Lab slope must be significant.
  iv) The intercept must be significant.   v) Either the Quiz or the Lab slope or both must be significant.

f) To see which slope is significant in the multiple regression equation $\hat{Final} = 50 + 0.3(Quiz) + 0.1(Lab)$ the computer ran a Z test and a t-test. Which table shows the t-test? *Circle one:*
      i) Table A   **ii)** Table B   **iii)** Not enough information to determine

Table A

	Slope	SE	t or Z	p
Quiz	0.3	0.1	3	0.185%
Lab	0.1	0.08	1.25	10.565%

Table B

	Slope	SE	t or Z	p
Quiz	0.3	0.1049	2.86	0.365%
Lab	0.1	0.0839	1.192	12.09%

g) How many degrees of freedom for the t-test? _____

h) Another variable is added to the model. Will R^2 go up or down?
     i) R^2 will go up or stay the same, it can't go down.
     ii) R^2 will go down or stay the same, it can't go up.
     iii) R^2 could go up, down or stay the same depending on the variable.

i) Let's say a 3rd variable that's correlated with the Final is added to the multiple regression model and the Quiz and Lab slopes stay the same. You can conclude the 3ʳᵈ variable must be
  i)   correlated with either Quizzes or Labs.
  ii)   correlated with both Quizzes and Labs.
  iii) uncorrelated with both Quizzes and Labs.
  iv)   negatively correlated with Quizzes and positively correlated with Labs (or vice versa) so their effects cancel out.

j) How was the multiple correlation, **R= 0. 5** calculated?
     i. It's the correlation between the Final scores, quiz scores and lab scores after they've been converted to Z scores.

     ii) It's the correlation between students' actual Final scores and their predicted ones from the multiple regression equation.

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Question 3
For each of the following is it appropriate to use logistic regression? **Circle Yes or No**.
   a)   Predicting income based on years of college.   YES   NO
   b)   Predicting ln(income) based on years of college   YES   NO
   c)   Predicting graduating college based on family income.   YES   NO
   d)   Predicting getting a scholarship based on gender and ethnicity.   YES   NO
   e)   Predicting favorite color based on gender   YES   NO

Question 4 Circle True or False for each statement below.
 a) The logistic regression model only handles X values that can be coded as 1's and 0's.   i)True   ii)False
 b) Transforming non-linear scatter plots into linear ones by converting Y to ln(Y) is called logistic regression.
    i)True   ii)False
 c) The assumptions needed to make inferences for linear and logistic regression are the same   i)True   ii)False

Question 5
How are the parameters chosen in logistic regression and linear regression?
Fill in the first blank below with "logistic" or "linear" and the second blank with "minimize" or "maximize".

a) In _____regression, the parameters are chosen to _____the sum of the squared errors

b) In _____regression, the parameters are chosen to _____ the likelihood of getting our sample data.

Question 6 Are F and t tests ever appropriate to test significance in Logistic regression models?
Choose one:
 a) Yes, when the sample size is small the F and t tests give more accurate results.

 b) No, because F and t tests can never be done on variables that have undergone log transformations.

 c) No, because F and t tests are never done when we are predicting counts (when Y is binary), since the SD can be estimated directly from the count.

Question 7   Part I On our survey, **178** students anonymously answered these 2 questions:
"Would you volunteer to be randomly assigned to either the online or in person section?"(No = 0, Yes =1)
"Which section are you in?" (L1=0, online=1)

To predict the probability of volunteering from section, we fit a logistic regression model. Here's the ln(odds) form of the

regression equation: $\ln\left(\dfrac{\hat{p}}{1-\hat{p}}\right) = -0.5261 + -0.7267(\text{Section})$

   a)   Are online students more or less likely to volunteer? *Choose one:* **i)** More   **ii)** Less   **iii)** Same **iv)** Not enough info

   b)   What is the probability that an L1 student would volunteer?   p=_____

   c)   What is the probability that an online student would volunteer? p=_____

   d)   The Odds Ratio = _____.

   e)   If we switched the coding for section to online = 0 and L1 =1 what would change? *Choose one:*
      i) Odds   **ii)** Probabilities   **iii)** Odds Ratio   **iv)** All   **v)** None

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f) Look at the table showing the 178 responses to the 2 questions.

Use the table to compute the odds for an L1 and online student volunteering. ***Please leave your answers in fraction form.***

	No	Yes	Total
L1	44	26	70
Online	84	24	108
Total	128	50	178

i) Odds for L1 = _____

ii) (Odds for Online = _____

iii) Should you get the same OR as in (d) above? (Assuming you compute the ratio of Online odds to L1 odds.)

　　　a) Yes, within rounding error　　　**b)** No

Question 7 Part II A third question on the same survey was: "How many people have you been in a serious relationship

with?"　Adding relationships to the model gives us:　　$\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = -1.33 + -1.03(\text{Section}) + 0.64(\text{Relationships})$

a) The χ^2 test for the overall regression effect: H_0: All β's $=0$ yielded a χ^2 **stat** $= 26$.
How many **degrees of freedom?** = _____

b) The p value $< 0.1\%$. This means that the probability that …***Choose only one:***
　　i) the null is true $< 0.1\%$　　**ii)** the null is false $> 99.9\%$　　**iii)** we'd get a χ^2 stat ≥ 26 if the null was true $< 0.1\%$

c) The relationship slope has a SE $= 0.14$. To test H_0: $\beta_{\text{relationship}}= 0$ against H_A: $\beta_{\text{relationship}} \neq 0$ compute the Z stat.

$$Z = _____$$

d) Since p _____5%, a 95% Confidence interval for the Relationship slope _____include _____.
Fill in the first blank with $>$ or $<$, the second with "does" or "does not", and the third blank with a number.

e) The OR for Relationship = _____ and the OR for Section=_____

f) Comparing two people in the same section, the person with 2 more relationships has_____ times the odds of volunteering. ***Fill in the blank with a number.***

g) Comparing an L1student with 4 relationships to an online student with 2 relationships, the L1 student has _____times the odds of volunteering. ***Fill in the blank with a number.***

h) What's the probability that an L1 student with 10 relationships will volunteer? _____.

i) Would the ln(odds) equation for Part II change if we reversed the coding for Section so that L1=1 and online=0 and kept everything else the same? If so, write the new equation in the blank provided.

a) No, it would not change.　　　b) Yes, it would change to $\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) =$ _____

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Question 8 A predictor of whether esophageal cancer has not metastasized to the lymph nodes is the diameter of the tumor. Below is the log odds regression equation predicting the probability of no metastasis from the diameter of the tumor (measured in cm) from a hypothetical study of 200 patients.

$$\ln (p/(1-p)) = 2 - 0.5 \text{ (Diameter)}$$

    a) Use the equation to estimate the **odds** and **probability** of no metastasis for a tumor of diameter = 8 cm. ***Show work.***

        i) Odds= _____   *ii)* Probability =_____

    b) How do the estimated *odds* of no metastasis change if the tumor increases in diameter by 1 cm ?
        i) odds are multiplied by 0.61   **ii)** the odds decrease by 0.5   **iii)** not enough info

    c) How does the estimated *probability* of no metastasis change if the tumor increases in diameter by 1 cm?
        i) the probability is multiplied by 0.61   **ii)** the probability decreases by 0.5   **iii)** not enough info

    d) How big a tumor would give a 50% probability of metastasis? _____

    e) How big a tumor would give a 40% probability of no metastasis? _____

    f) Below is a graph of the probability form of the model.

    Write its equation: p =_____ and fill in the 2 blanks on the X-axis with the correct diameter values (in cm).
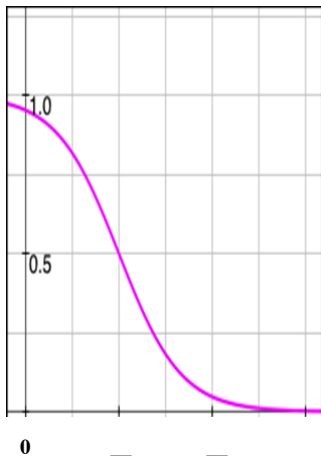
Fill in the 2 blanks above with the correct numbers.

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Question 9 pertains to the Wilcoxon Mann Whitney test
A randomized double-blind test was done to test the effectiveness of a drug to cure warts. The subjects were 8 people with lots of warts. 4 subjects took the drug and 4 took the placebo. The number of warts that disappeared for each of the 8 subjects is recorded below.

Drug Group: $0, 10, 11, 40$ Placebo group: $5, 6, 8, 9$

Part 1
Fill out the chart below. Show work for how you got the observed rank sum for each group.
No partial credit since you should know what the totals should be and you can check your work.

	Observed Rank Sum	Expected Rank Sum	Observed - Expected
Drug Group			
Placebo Group			
Total should be….			

Question 9 Part II
The sample sizes in Part I are too small to use the Normal Approximation but let's just assume for the purpose of this exam that you can use the Normal Approximation anyway.

H_0 : The drug works no better than the placebo in the population
H_A : The drug *does work better* than the placebo in the population for some segments of the population.

a) Compute the Z stat for the drug group.   Use $SE_R = \sqrt{\dfrac{n_1 n_2 (N+1)}{12}}$

Z=

b) Label the Observed and Expected Value for both the Z and R_{Drug} axes below. Calculate the p-value and shade the appropriate area. (R_{Drug} is the Rank Sum for the Drug group.)

Z

R_{Drug}
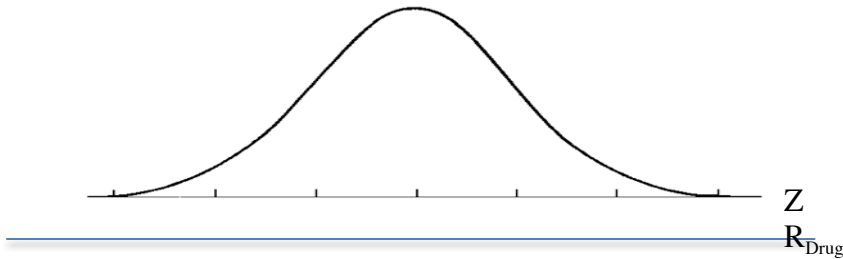
c) What do you conclude? (Remember, we're assuming the sample size was large enough so the normal approximation is valid).
    i)   Reject the null, we're sure the drug works.
    ii) Reject the null, we have strong evidence the drug works.
    iii) Cannot reject the null, it's plausible the drug works no better than a placebo.
    iv) There's over a 95% chance the drug didn't work.

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Question 9 cont.
Drug Group: $0, 10, 11, 40$ Placebo group: $5, 6, 8, 9$

d) What's the U statistic for the Drug Group? For the Placebo group?

    $U_{drug} =$ $U_{placebo} =$

e) The sum of the 2 group U statistics must = _____ for any 2 groups with 4 members each.
(Check that your $U_{drug} + U_{placebo}$ is correct.)

f) Would you get the same Z stat and p-value using U_{drug} as you did using R_{drug} in part (a)?
        i) Yes, exactly the same.
        ii) Exactly the same values but the Z-scores would be opposite signs.
        iii) No, the p-value would be smaller using U.
        iv) No, the p-value would be larger using U.

Question 10 pertains to the Kruskal Wallis test *(6 pts)*
There are 3 forms of this Final. Suppose at the grading meeting I randomly select 9 Finals and grade them with these results:
Form A: $80, 81, 82$ Form B: $83, 84, 85$ Form C: 86,87,89

Null Hypothesis: No difference in difficulty of the exams in the population. We just happen to observe differences in our sample due to chance variation.
Alternative Hypothesis: At least one of the exams is of different difficulty in the population.

a)   The Rank Sum for Form A= _____, Form B=_____ and Form C=_____

b)   The total Rank Sum for any set of 9 numbers is always= _____. (give a number.)

a)   The H-stat = 7.2   Would any other arrangement of 9 numbers into 3 groups of 3 yield a higher H-stat?

    i) No   ii) Yes   iii) Not enough info

b)   For large enough samples we can best approximate the distribution of the H stat with
    i) Z stat   ii) t stat iii) Chi-square stat   iv) the F stat

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 Question 11
a) If we decide to do a non-parametric test and use the Spearman correlation coefficient to test the null hypothesis that the population correlation is 0 then the appropriate test-statistic for small samples (<7) is …

        i)   a t-statistic
        ii)   Spearman correlation tables that calculate the exact probability distribution
        iii)   2 sample t-statistic
        iv)   an F-test
        v)   a Chi Square test

b) For large enough samples the appropriate test statistic is
   i) Z-test
   ii) t-test
   iii) either
   iv) F-test
   v) none of the above

Question 12
Look at the 3 data sets below:
Data Set 1: (1,2), (2, 4) , (3, 6) , (4,8)
Data Set 2: (-1, 5) (-2, 4) (-3, 3)
Data Set 3: (1,1) (8,9) (103,10)

For which data set(s) is $r \neq r_s$?

Critical Values for F distribution at p = 5% and p = 1%

F Distribution critical values for P=0.05

▼ Denominator

Numerator DF

DF	1	2	3	4	5	7	10	15	20	30	60	120	500	1000
1	161.45	199.50	215.71	224.58	230.16	236.77	241.88	245.95	248.01	250.10	252.20	253.25	254.06	254.19
2	18.513	19.000	19.164	19.247	19.296	19.353	19.396	19.429	19.446	19.462	19.479	19.487	19.494	19.495
3	10.128	9.5522	9.2766	9.1172	9.0135	8.8867	8.7855	8.7028	8.6602	8.6165	8.5720	8.5493	8.5320	8.5292
4	7.7086	6.9443	6.5915	6.3882	6.2560	6.0942	5.9644	5.8579	5.8026	5.7458	5.6877	5.6580	5.6352	5.6317
5	6.6078	5.7862	5.4095	5.1922	5.0504	4.8759	4.7351	4.6187	4.5582	4.4958	4.4314	4.3985	4.3731	4.3691
7	5.5914	4.7375	4.3469	4.1202	3.9715	3.7871	3.6366	3.5108	3.4445	3.3758	3.3043	3.2675	3.2388	3.2344
10	4.9645	4.1028	3.7082	3.4780	3.3259	3.1354	2.9782	2.8450	2.7741	2.6996	2.6210	2.5801	2.5482	2.5430
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7066	2.5437	2.4035	2.3275	2.2467	2.1601	2.1141	2.0776	2.0718
20	4.3512	3.4928	3.0983	2.8660	2.7109	2.5140	2.3479	2.2032	2.1241	2.0391	1.9463	1.8962	1.8563	1.8498

F Distribution critical values for P=0.01

▼ Denominator

Numerator DF

DF	1	2	3	4	5	7	10	15	20	30	60	120	500	1000
1	4052.2	4999.5	5403.4	5624.6	5763.6	5928.4	6055.8	6157.3	6208.7	6260.6	6313.0	6339.4	6359.5	6362.7
2	98.503	99.000	99.166	99.249	99.299	99.356	99.399	99.433	99.449	99.466	99.482	99.491	99.497	99.498
3	34.116	30.817	29.457	28.710	28.237	27.672	27.229	26.872	26.690	26.504	26.316	26.221	26.148	26.137
4	21.198	18.000	16.694	15.977	15.522	14.976	14.546	14.198	14.020	13.838	13.652	13.558	13.486	13.474
5	16.258	13.274	12.060	11.392	10.967	10.455	10.051	9.7222	9.5526	9.3793	9.2020	9.1118	9.0424	9.0314
7	12.246	9.5467	8.4513	7.8466	7.4605	6.9929	6.6201	6.3143	6.1554	5.9920	5.8236	5.7373	5.6707	5.6601
10	10.044	7.5594	6.5523	5.9944	5.6363	5.2001	4.8492	4.5582	4.4055	4.2469	4.0818	3.9964	3.9303	3.9195
15	8.6831	6.3588	5.4169	4.8932	4.5557	4.1416	3.8049	3.5223	3.3719	3.2141	3.0471	2.9594	2.8906	2.8796
20	8.0960	5.8489	4.9382	4.4306	4.1027	3.6987	3.3682	3.0880	2.9377	2.7785	2.6078	2.5167	2.4446	2.4330
30	7.5624	5.3903	4.5098	4.0179	3.6990	3.3046	2.9791	2.7002	2.5486	2.3859	2.2078	2.1108	2.0321	2.0192
60	7.0771	4.9774	4.1259	3.6491	3.3388	2.9530	2.6318	2.3522	2.1978	2.0284	1.8362	1.7264	1.6328	1.6169
120	6.8509	4.7865	3.9490	3.4795	3.1736	2.7918	2.4720	2.1914	2.0345	1.8600	1.6557	1.5330	1.4215	1.4015
500	6.6858	4.6479	3.8210	3.3569	3.0539	2.6751	2.3564	2.0746	1.9152	1.7353	1.5175	1.3774	1.2317	1.2007
1000	6.6603	4.6264	3.8012	3.3379	3.0356	2.6571	2.3387	2.0564	1.8967	1.7158	1.4953	1.3513	1.1947	1.1586

Chi-square table
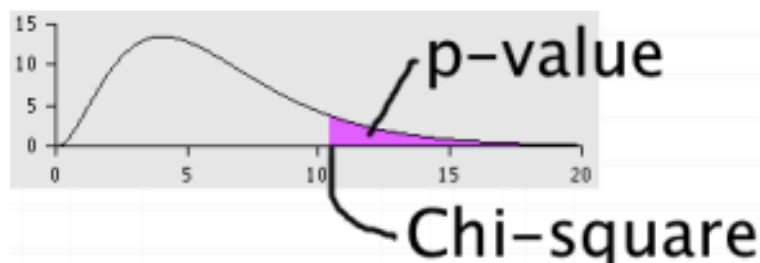
Degrees of freedom ↓	30%	10%	5%	1%	0.1%	← p-value
1	1.07	2.71	3.84	6.63	10.83	
2	2.41	4.61	5.99	9.21	13.82	
3	3.66	6.25	7.81	11.34	16.27	
4	4.88	7.78	9.49	13.28	18.47	
5	6.06	9.24	11.07	15.09	20.52	
6	7.23	10.64	12.59	16.81	22.46	
7	8.38	12.02	14.07	18.48	24.32	
8	9.52	13.36	15.51	20.09	26.12	
9	10.66	14.68	16.92	21.67	27.88	
10	11.78	15.99	18.31	23.21	29.59	
11	12.90	17.28	19.68	24.72	31.26	
12	14.01	18.55	21.03	26.22	32.91	← Chi-square
13	15.12	19.81	22.36	27.69	34.53	
14	16.22	21.06	23.68	29.14	36.12	
15	17.32	22.31	25.00	30.58	37.70	
16	18.42	23.54	26.30	32.00	39.25	
17	19.51	24.77	27.59	33.41	40.79	
18	20.60	25.99	28.87	34.81	42.31	
19	21.69	27.20	30.14	36.19	43.82	
20	22.77	28.41	31.41	37.57	45.31	
21	23.86	29.62	32.67	38.93	46.80	
22	24.94	30.81	33.92	40.29	48.27	
23	26.02	32.01	35.17	41.64	49.73	
24	27.10	33.20	36.42	42.98	51.18	

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Student's curve, with
degrees of freedom shown
at the left of the table

Student's *t*-TABLE

The shaded area is
shown along the top
of the table

t   Is shown in the
     body of the table
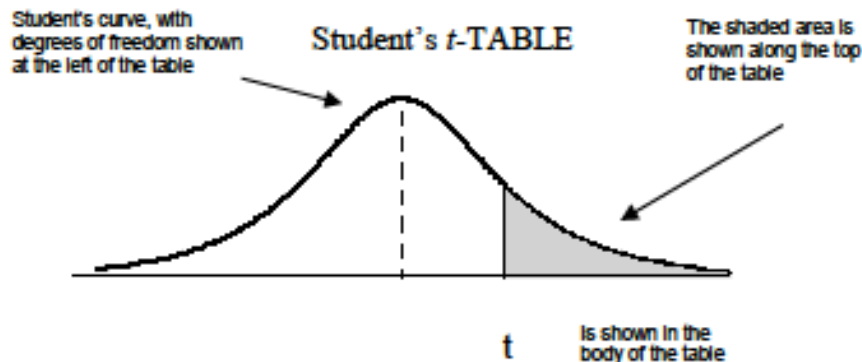
Degrees of freedom	25%	10%	5%	2.5%	1%	0.5%
1	1.00	3.08	6.31	12.71	31.82	63.66
2	0.82	1.89	2.92	4.30	6.96	9.92
3	0.76	1.64	2.35	3.18	4.54	5.84
4	0.74	1.53	2.13	2.78	3.75	4.60
5	0.73	1.48	2.02	2.57	3.36	4.03
6	0.72	1.44	1.94	2.45	3.14	3.71
7	0.71	1.41	1.89	2.36	3.00	3.50
8	0.71	1.40	1.86	2.31	2.90	3.36
9	0.70	1.38	1.83	2.26	2.82	3.25
10	0.70	1.37	1.81	2.23	2.76	3.17
11	0.70	1.36	1.80	2.20	2.72	3.11
12	0.70	1.36	1.78	2.18	2.68	3.05
13	0.69	1.35	1.77	2.16	2.65	3.01
14	0.69	1.35	1.76	2.14	2.62	2.98
15	0.69	1.34	1.75	2.13	2.60	2.95
16	0.69	1.34	1.75	2.12	2.58	2.92
17	0.69	1.33	1.74	2.11	2.57	2.90
18	0.69	1.33	1.73	2.10	2.55	2.88
19	0.69	1.33	1.73	2.09	2.54	2.86
20	0.69	1.33	1.72	2.09	2.53	2.85
21	0.69	1.32	1.72	2.08	2.52	2.83
22	0.69	1.32	1.72	2.07	2.51	2.82
23	0.69	1.32	1.71	2.07	2.50	2.81
24	0.68	1.32	1.71	2.06	2.49	2.80
25	0.68	1.32	1.71	2.06	2.49	2.79

STAT 200 Final Exam Study Guide Questions for Post Exam 3 Material.

STANDARD NORMAL TABLE
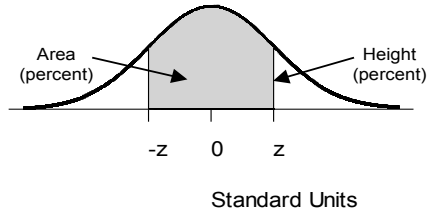
z	Area		z	Area		z	Area
0.00	0.00		1.50	86.64		3.00	99.730
0.05	3.99		1.55	87.89		3.05	99.771
0.10	7.97		1.60	89.04		3.10	99.806
0.15	11.92		1.65	90.11		3.15	99.837
0.20	15.85		1.70	91.09		3.20	99.863
0.25	19.74		1.75	91.99		3.25	99.885
0.30	23.58		1.80	92.81		3.30	99.903
0.35	27.37		1.85	93.57		3.35	99.919
0.40	31.08		1.90	94.26		3.40	99.933
0.45	34.73		1.95	94.88		3.45	99.944
0.50	38.29		2.00	95.45		3.50	99.953
0.55	41.77		2.05	95.96		3.55	99.961
0.60	45.15		2.10	96.43		3.60	99.968
0.65	48.43		2.15	96.84		3.65	99.974
0.70	51.61		2.20	97.22		3.70	99.978
0.75	54.67		2.25	97.56		3.75	99.982
0.80	57.63		2.30	97.86		3.80	99.986
0.85	60.47		2.35	98.12		3.85	99.988
0.90	63.19		2.40	98.36		3.90	99.990
0.95	65.79		2.45	98.57		3.95	99.992
1.00	68.27		2.50	98.76		4.00	99.9937
1.05	70.63		2.55	98.92		4.05	99.9949
1.10	72.87		2.60	99.07		4.10	99.9959
1.15	74.99		2.65	99.20		4.15	99.9967
1.20	76.99		2.70	99.31		4.20	99.9973
1.25	78.87		2.75	99.40		4.25	99.9979
1.30	80.64		2.80	99.49		4.30	99.9983
1.35	82.30		2.85	99.56		4.35	99.9986
1.40	83.85		2.90	99.63		4.40	99.9989
1.45	85.29		2.95	99.68		4.45	99.9991