In almost all problems, I have given the answers to four significant digits. If your answer is slightly different from one of mine, consider that to be roundoff error and mark the closely matching one. If your answer differs from the closest one of mine by more than one percent (meaning the ratio of yours to mine is less than 0.99 or greater than 1.01), then mark "J) None of the preceding". The first fifteen problems are the ones randomly chosen from the homework exercises. If you do all of them correctly, you can breathe more easily (since you will have reached a passing level of D−) as you head into the ten non-homework questions.

1. The following table compares what Valley View High School students did after graduation in 1959, 1970, and 1980. Find the conditional distribution of entering the military for each year (as a percentage) and then report the sum of the three conditional percentages.

Year **What they did**	**1959**	**1970**	**1980**
Cont. Ed.	150	350	300
Employed	100	130	80
Military	33	21	23
Other	25	50	42

A) 16.69 B) 19.69 C) 22.69 D) 25.69 E) 28.69 F) 31.69 G) 34.69 H) 37.69 I) 40.69 J) None of the preceding

2. Following is a stem-and-leaf plot of the number of home runs per season of Roger Maris in his ten years playing in the American League. (Roger Maris broke Babe Ruth's record, and his record was later broken by Mark McGwire.) Calculate the standard deviation of this data.

0 | 8
1 | 346
2 | 368
3 | 39
4 |
5 |
6 | 1

A) 13.61 B) 15.61 C) 17.61 D) 19.61 E) 21.61 F) 23.61 G) 25.61 H) 27.61 I) 29.61 J) None of the preceding

3. Calculate the position of the upper fence for a boxplot of the data from Problem 2. (Careful; this is not necessarily the same as the endpoint of the upper whisker.)

A) 61.5 B) 64.5 C) 67.5 D) 70.5 E) 73.5 F) 76.5 G) 79.5 H) 82.5 I) 85.5 J) None of the preceding

4. An incoming freshperson took placement exams in Swahili and Sanskrit. The student scored 92 in Swahili and 95 in Sanskrit. The overall results on the Swahili exam had a mean of 76 with a standard deviation of 9, while the mean Sanskrit exam had a mean of 84 with a standard deviation of 6. To determine which exam s/he did better on, the student calculates *Z*-scores for both exams. Find the value of the Sanskrit *Z*-score minus the Swahili *Z*-score.

A) 0.05556 B) 0.06667 C) 0.07778 D) 0.08889 E) 0.1000 F) 0.1111 G) 0.2222 H) 0.3333 I) 0.4444 J) None of the preceding

5. Suppose police set up radar surveillance on Forsyth Boulevard. They hand out a large number of tickets to drivers going a mean of 40 mph, with a standard deviation of 4.1 mph, a maximum of 53 mph, and an IQR of 6.7 mph. Local law prescribes fines of $90 plus $15 per mile per hour over the 30 mph speed limit. Find the mean of all the fines.

A) $240 B) $255 C) $270 D) $285 E) $300 F) $315 G) $330 H) $345 I) $360 J) None of the preceding

6. An exercise in the book proposes modeling IQ scores with $N(100,16)$. Using the membership criterion of the Mensa Society of being in the upper 2% of all IQ scores, what score is needed to qualify you for membership? Consider IQ scores to be continuously distributed (not rounded to the nearest whole number).

A) 112.9 B) 116.9 C) 120.9 D) 124.9 E) 128.9 F) 132.9 G) 136.9 H) 140.9 I) 144.9 J) None of the preceding

7. A U.S. Census Bureau report from days gone by found that 37% of homes had a personal computer and 23% had access to the internet. A newspaper concluded that 60% of homes had a computer or internet access. What foolish assumption did the newpaper writer make?

A) Continuity B) Disjointness C) Normality D) Poisson E) Hypergeometric F) Independence G) Dependence H) Binomiality I) Fairness J) None of the preceding

8. The 500-m speed skating times of 25 men in a past Winter Olympics had a mean of 69.89 seconds and a standard deviation of 1.76 seconds. If the Normal model is appropriate, what percent of the times should fall between 68 seconds and 70 seconds?

A) 38.35% B) 41.35% C) 44.35% D) 47.35% E) 50.35% F) 53.35% G) 56.35% H) 59.35% I) 62.35% J) None of the preceding

9. The following output was obtained from a regression of nicotine versus tar in cigarettes:

Dependent variable is: nicotine
R squared = 81.3%

Variable	**Coefficient**
Constant	0.162045
Tar	0.071349

If a cigarette is 1.5 standard deviations below average in nicotine content, how many standard deviations below average do we expect it to be in tar content?

A) 1.352 B) 1.422 C) 1.492 D) 1.562 E) 1.632 F) 1.702 G) 1.772 H) 1.842 I) 1.912 J) None of the preceding

10. Given the information in Problem 9, find the slope of the "other" regression line, the one predicting tar content from nicotine content.

A) 5.391 B) 11.39 C) 17.39 D) 23.39 E) 29.39 F) 35.39 G) 41.39 H) 47.39 I) 53.39 J) None of the preceding

11. Scientist Bobby Boyle examined the relationship between the volume in which a gas is contained and the pressure in that container. He used a cylindrical container with a moveable top that could be raised or lowered to change the volume. He measured the *Height* in inches by counting equally spaced marks on the cylinder, and measured the *Pressure* in inches of mercury (as in a barometer). Some of his data are listed in the table. Create an appropriate model and use it to estimate the *Pressure* for *Height* = 18.6 inches.

Height	48	44	40	36	32	28
Pressure	29.1	31.9	35.3	39.3	44.2	50.3

A) 77.30 B) 82.80 C) 88.30 D) 93.80 E) 99.30 F) 104.8 G) 110.3 H) 115.8 I) 121.3 J) None of the preceding

12. The table below shows stopping distances in feet for a car tested 2 times at each of five speeds. We hope to create a model that predicts Stopping Distance from the Speed of the car. After re-expressing the data to straighten the scatterplot, as in your homework, fit the model and estimate the stopping distance for a car traveling 80 mph.

Speed (mph)	**Stopping Distances (feet)**
20	64, 62
30	104, 110
40	140, 165
50	231, 207
60	310, 325

A) 478.6 B) 498.6 C) 518.6 D) 558.6 E) 578.6 F) 598.6 G) 618.6 H) 638.6 I) 658.6 J) None of the preceding

13. A statistics instructor created a linear regression equation to predict students' final exam scores from their midterm exam scores. The regression equation was Final = 10 + 0.85 Midterm. One of the students scored 90 on the midterm but got overconfident, slacked off, and scored only 27 on the final exam. What is the residual for this student?

A) −38.50 B) −41.50 C) −44.50 D) −47.50 E) −50.50 F) −53.50 G) −56.50 H) −59.50 I) −62.50 J) None of the preceding

14. Highway planners investigated the relationship between traffic *Density* (number of automobiles per mile) and the average speed of the traffic on a moderately large city thoroughfare. The data were collected at the same location at ten different times over a span of three months. They found a mean traffic *Density* of 48.6 cars per mile (cpm) with standard deviation of 21.07 cpm. Overall, the cars' average *Speed* was 36.38 mph, with standard deviation of 9.68 mph. These researchers found the regression line for these data to be *Speed* = 58.35 – 0.452 *Density*. What is the value of the correlation coefficient between *Speed* and *Density*?

A) −0.6638 B) −0.7038 C) −0.7438 D) −0.7838 E) −0.8238 F) −0.8638 G) −0.9038 H) −0.9438 I) −0.9838 J) None of the preceding

15. In Problem 14, what is the value of the residual for a traffic *Density* of 94.16 cpm with an observed *Speed* of 30 mph?

A) 10.21 B) 11.21 C) 12.21 D) 13.21 E) 14.21 F) 15.21 G) 16.21 H) 17.21 I) 18.21 J) None of the preceding

16. In Problem 14, what is the value of slope of the "other" regression equation, which models *Density* as a linear function of *Speed*?

A) −1.241 B) −1.541 C) −1.841 D) −2.141 E) −2.441 F) −2.741 G) −3.041 H) −3.341 I) −3.641 J) None of the preceding

17. Most graduate schools of business require applicants for admission to take the GMAT. Total scores on the GMAT for the more than 500,000 people who took the exam between April 2001 and March 2003 are normally distributed with mean = 525 and standard deviation = 109. What percent of test-takers have scores above 650? (Assume the scores are continuously distributed, not rounded.)

A) 10.07% B) 10.57% C) 11.57% D) 12.07% E) 12.57% F) 13.07% G) 13.57% H) 14.07% I) 14.57% J) None of the preceding

18. The ACT is an alternative to the SAT, but it is scored very differently from the SAT. Its mean is designed to be 18, and its standard deviation is designed to be equal to 6. The range of possible ACT scores consists of the integers from 0 to 36. Assuming that the underlying distribution of ACT scores is continuous and normal, but the reported scores are rounded to the nearest whole number, find the percent of people whose reported score is equal to 30.

A) 0.6630% B) 0.7030% C) 0.7430% D) 0.7830% E) 0.8230% F) 0.8630% G) 0.9030% H) 0.9430% I) 0.9830% J) None of the preceding

19. Here are summary statistics for Olympic long jumps and high jumps, in inches:

Long jump: Mean = 307 StdDev = 21.7
High jump: Mean = 83 StdDev = 6.9
Correlation between long and high: $r = 0.802$

What is the slope of the line of regression for estimating high jump from long jump?

A) 0.2050 B) 0.2150 C) 0.2250 D) 0.2350 E) 0.2450 F) 0.2550 G) 0.2650 H) 0.2750 I) 0.2850 J) None of the preceding

20. For the normal distribution $N(100,15)$, find the distance between the upper and lower boxplot fences.

A) 60.94 B) C) 64.94 D) 68.94 E) 72.94 F) 76.94 G) 80.94 H) 84.94 I) 88.94 J) None of the preceding

21. The yearly rate of return on stock indexes (which combine many individual stocks) is approximately normal with mean 11% and standard deviation 14%. Over many years, what fraction of years have a negative rate of return?

A) 0.1760 B) 0.1860 C) 0.1960 D) 0.2060 E) 0.2160 F) 0.2260 G) 0.2360 H) 0.2460 I) 0.2560 J) None of the preceding

22. Use the following data to estimate the miles per gallon of a Loremo, a German car with gross vehicle weight 1000 pounds, due to be produced in 2009. Be sure to use the transformation specified in the book or you will be trying to fit a straight line to a curve.

Miles per Gallon	Weight (pounds)
32	2524
23	3088
22	3260
18	3908
16	4469
15	4802

A) 87.76 B) 91.76 C) 95.76 D) 99.76 E) 103.8 F) 107.8 G) 111.8 H) 115.8 I) 119.8 J) None of the preceding

23. Fifty-three men qualified for the men's alpine downhill race in Salt Lake City. The gold medal winner finished in 1 minute 39.13 seconds. All competitors' times were given in a table for which the mean was 102.71 seconds. If the Normal model is appropriate and its standard deviation is 2.75 seconds, what percent of times should be less than 100 seconds?

A) 10.22% B) 11.22% C) 12.22% D) 13.22% E) 14.22% F) 15.22% G) 16.22% H) 17.22% I) 18.22% J) None of the preceding

24. Every Normal model is defined by its parameters. For the Normal model with standard deviation equal to 200 and 83% of all values larger than 950, what is the value of the mean?

A) 1141 B) 1191 C) 1241 D) 1291 E) 1341 F) 1391 G) 1441 H) 1491 I) 1541 J) None of the preceding

25. The value of a log is based on the number of board feet of lumber the log may contain. To estimate the amount of lumber in a log, buyers measure the diameter inside the bark at the smaller end. Then they look in a table based on the Doyle Log Scale. The table below shows the Doyle Log Scale estimates for logs 8 feet long.

Log Diameter (inches)	12	16	20	24	28
Board Feet	32	72	128	200	288

According to the model represented in this table, how many board feet of lumber does a log that is 8 feet long and 31 inches in diameter contain?

A) 244.5 B) 264.5 C) 284.5 D) 304.5 E) 324.5 F) 344.5 G) 364.5 H) 384.5 I) 404.5 J) None of the preceding