

Make sure that your scantron matches the color of this page. **Read ALL directions carefully before beginning the exam.**

- Anyone found using a graphing/programmable calculator or cell phone during the final exam will receive a grade of "0".
- You may write on this exam. You may not use other paper unless you raise your hand and it is provided by an instructor.
- If you finish after 45 minutes, you can take this test with you. If you finish prior to 45 minutes, you will need to turn this test in along with your scantron.
- Please turn in your scantron to **YOUR** teaching assistant and have a picture ID ready.
- On your scantron, encode your name as specified on the scantron, encode your Dawgtag as your "Identification Number," and encode your **Section #** "OP" under the area labeled "Special Codes."

**SAMPLE SCANTRON**

LAST NAME SPACE FIRST NAME

NAME (Last, First, M.I.)

DOE JOHN

SEX

GRADE OR EDUC

BE SURE TO BUBBLE IN!!

IN A THROUGHT I PUT YOUR DAWGTAG # IN "OP" PUT YOUR SECTION # (see list)

BIRTHDATE			IDENTIFICATION NUMBER													SPECIAL CODES										
MO.	DAY	YR.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P								
Jan.			8	5	0	0	1	5	6	1	6							05								
Feb.																										
Mar.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Apr.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								
May	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2								
Jun.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3								
Jul.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4								
Aug.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5								
Sep.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6								
Oct.	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7								
Nov.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8								

**INSTRUCTOR/DAYS IS GIVEN:**

**Instructor DEAN**  
 9:00 on W & F is Sec. 02;  
 10:00 on W & F is sec. 04;  
 12:00 on W & F is Sec. 06

**Instructor Parks**  
 9:00 on T&Th is Sec. 01  
 10:00 on T&Th is Sec. 03

**Instructor Gamachige**  
 11:00 on W & F is Sec. 05

**Instructor Imhoff**  
 2:00 on T & Th. Is Sec. 11

**Instrucor Gallage**  
 2:00 on W & F is Sec. 12

**Instructor Wang**  
 3:00 on T & Th is sec. 13

The last page of this exam is the formula sheet and z-score table. You may tear that page out of the exam for your reference.

**You must use a pencil to fill in your scantron!**

1. Last semester, Tim earned an average test score of 75 points on his math tests. This semester, his average score is 82 points. What is the percent of increase in Tim's average test score?  
  
(a) 9.3%      (b) 7%      (c) 8.5%      (d) 0.09%      (e) None of these
  
2. Suppose that \$10,500 is invested at 4.6% compounded quarterly. How much interest is earned after 5 years? First find the amount in the account and use it to find the interest.  
  
A) interest earned: \$ 2709.49  
B) interest earned: \$ 2697.97  
C) interest earned: \$ 2415  
D) interest earned: \$24605.83  
E) interest earned: \$ 13197.97
  
3. Assume you have a graph with vertex set  $V=\{A, B, C, D, E\}$  and edge set  $E=\{AB, AD, BD, BE, CD, DE, DD\}$ . What is the degree of vertex D?  
  
(a) 6      (b) 4      (c) 3      (d) 2      (e) none of these
  
4. The number of edges in a tree with 55 vertices is  
  
(a) 54      (b) 54!      (c) 55      (d)  $2^{54}$       (e) None of these
  
5. A loan has a principal amount of \$5000 with a simple interest rate of 6.5%. Find the loan's future value in 6 months.  
  
(a) \$162.50      (b) \$6950      (c) \$7377.14      (d) \$5162.50      (e) None of these

6. Kelly owns five one-bedroom apartments that she rents for \$600 a month each and three two-bedroom apartments that she rents for \$900 a month each. She pays \$13000 in property taxes each year and \$22,000 in maintenance costs for the year. What is her profit for the year?
- (a) \$36,500    (b) \$59,400    (c) \$33,400    (d) \$27,350    (e) None of these

**For the next 4 problems, use the following set of data.**

{37, 26, 13, 8, 12, 29, 6, 17, 48, 26}

7. Calculate the mean.
- (a) 24.7    (b) 26    (c) 21.5    (d) 22.2    (e) None of these
8. What is the median?
- (a) 20.1    (b) 24    (c) 21.5    (d) 23.3    (e) None of these
9. Compute the 5-number summary.
- (a) 6, 13, 21.5, 26, 48  
(b) 6, 12, 21.5, 29, 48  
(c) 6, 12.5, 17, 29, 48  
(d) 6, 12, 26, 37, 48  
(e) None of these
10. What is the range?
- (a) 40    (b) 27    (c) 36    (d) 21    (e) None of these
11. A graph has an Euler path if
- (a) It is connected and has only even vertices.  
(b) It is connected and has exactly one odd vertex.  
(c) It is connected and has exactly two odd vertices.  
(d) It is connected and has only odd vertices.  
(e) None of these

12. The number of Hamiltonian circuits in a complete graph with 20 vertices is  
 (a) 19!            (b) 19            (c) 20            (d) 20!            (e) None of these

13. What is the mode for the following data set: 2, 3, 3, 7, 7, 8, 9, 9, 10, 11, 11, 11  
 (a) 9 and 11            (b) 9            (c) 11            (d) 7.6            (e) none of these

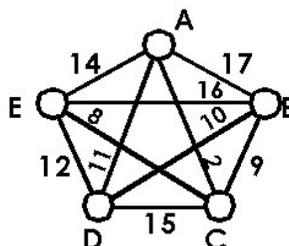
14. The parents of a new crop of roses have genetics RR and RW where RR is red and both RW and WW are white as white is dominant. Suppose that two RW cross. What is the probability that these parents produce an offspring that is white?  
 (a) 1/4            (b) 1/2            (c) 1            (d) 0            (e) 3/4

15. If Calvin pays \$202.86 per month for his car payment on a \$12000 car which was financed for 6 years. How much interest will she pay?  
 (a) \$14605.92    (b) \$2605.92    (c) \$10782.84    (d) \$11797.14    (e) None of these

16. Given a periodic deposit of \$50 at the end of every quarter into a savings account paying 3.2% compounded quarterly. After 10 years, what is the amount in the account? (Round answer to the nearest dollar.)  
 (a) \$2515.14    (b) \$2640.00    (c) \$68.77            (d) \$2346.10    (e) None of these

17. The nearest-neighbor tour starting with vertex A is given by:

- A) A,C,B,D,E,A
- B) A,C,B,E,D,A
- C) A,C,E,B,D,A
- D) A,C,E,D,B,A
- E) A,B,C,D,E,A



18. Interest that is calculated only on the original principal is

- (a) compound interest.
- (b) mortgage interest.
- (c) simple interest.
- (d) complex interest.
- (e) None of these.

19. The random variable X is the number of children under 18 in families in a particular town. Use the following probability distribution table to find the expected number of children per family (expected value).

X	P(x)
0	.2273
1	.3684
2	.2161
3	.1309
4	.0322
5	.0241

- A) 1      B) 1.4366      C) 2.6645      D) 1.4426      E) none of these

20. Find the taxable income for a tax payer that earned wages of \$43,000; received \$2100 in interest from a savings account, and contributed \$5200 to a tax-deferred retirement plan. He was entitled to a personal exemption of \$3600 and had deductions totaling \$5300.

- (a) \$37,940
- (b) \$31,000
- (c) \$29,000
- (d) \$24,800
- (e) None of these

21. Express  $\frac{7}{16}$  as a percent.

- (a) 22.86%      (b) 38.65%      (c) 0.4375%      (d) 43.75%      (e) None of these

**Use the following information for the next 3 problems:**

A box contains 3 blue marbles, 5 red marbles, 7 green marbles, and 11 yellow marbles.

22. What are the odds of drawing a blue marble?

- (a) 3:26      (b) 3/26      (c) 3: 23      (d) 26:3      (e) None of these.

23. What is the probability of drawing a red and then a blue marble without replacement?

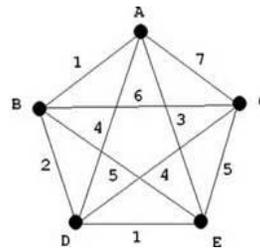
- (a) 0.023      (b) 0.022      (c) 0.0.15      (d) 0.31      (e) None of these

24. What is the probability of drawing a yellow or a blue marble on a single draw?

- (a) 0.54      (b) 0.05      (c) 14      (d) 0.62      (e) None of these

25. Find the total weight of the minimum spanning tree using Kruskal's Algorithm.

- A) 8  
 B) 7  
 C) 9  
 D) 10  
 E) none of these



26. The annual interest rate and a line of an amortization schedule (the first month) for a loan are given. Assume that payments of \$300 are made monthly and that the annual interest rate is 6%. Find the amount of interest paid the 2<sup>nd</sup> month.

Payment #	Interest Payment	Principal Payment	Balance of Loan
1	110	190	\$21,700
2	????		

- A) \$92.10      B) \$108.50      C) \$191.50      D) \$1302      E) \$105.30

27. The price of a home is \$165,000. The bank requires a 15% down payment. Find the amount of the mortgage.

- (a) \$164,085      (b) \$141,120      (c) \$140250      (d) \$24,750      (e) None of these

28. Juanita takes out a conventional loan for four years at 6.6% compounded monthly. What are her monthly payments if she borrows \$6,000?

- A) \$125.00
- B) \$333.33
- C) \$142.57
- D) \$176.90
- E) \$81.46

29. What is the GPA (on a 4 point scale) for a student who earned:

- A in Math (4 credit hours)
- A in Science (3 credit hours)
- B in History (2 credit hours)
- B in English (4 credit hours)

- (a) 3.00
- (b) 3.54
- (c) 3.25
- (d) 3.29
- (e) None of these

30. Find the standard deviation. Round only the final answer to 2 decimal places.

20, 35, 40, 45, 45

- a) 10.37
- b) 37.00
- c) 9.27
- d) 10.84
- e) None of these

31. Assume the population in the US is normally distributed with a mean IQ of 100 and standard deviation of 15. According to the z-score table, approximately what percent of the US population has an IQ above 112?

- (a) 19.77%
- (b) 0.8%
- (c) 21.19%
- (d) 78.81%
- (e) None of these

Use the following information and table for the next two problems.

In a recent survey 400 students were asked to select their favorite history channel program. The results are summarized in the following table.

	<b>Swamp People</b>	<b>Ancient Aliens</b>	<b>Counting Cars</b>
<b>Freshman</b>	25	45	30
<b>Sophomore</b>	15	75	60
<b>Junior</b>	60	80	10

32. If a student is selected at random, what is the probability that the student is a junior?

- (a) 0.15      (b) 0.375      (c) 0.333      (d) 1.40      (e) none of these

33. If it is known that a student's favorite program is Counting Cars, what is the probability that he/she is a junior?

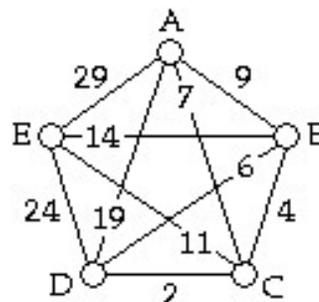
- (a) 0.067      (b) 0.08      (c) 0.10      (d) 0.025      (e) None of these

34. You borrow \$1000 from a friend and promise to pay back \$1140 in 4 years. What simple interest rate, to the nearest tenth of a percent, will you pay?

- (a) 11.67%      (b) 3.5%      (c) 35%      (d) 0.035%      (e) None of these

35. Use the best edge (cheapest link) algorithm to find a Hamiltonian circuit. Then, write the circuit starting with vertex E.

- A) E,A,C,B,D,E  
 B) E,A,B,C,D,E  
 C) E,C,B,D,A,E  
 D) E,D,A,B,C,E  
 E) none of these



**For the next two questions, use the following information.**

The Homecoming committee members are voting on the theme of this year's Homecoming festivities: the 1950s (F), the 1970s (S), or the 1980s (E). Their votes are summarized in the following preference table.

<b>Number of Votes</b>	<b>14</b>	<b>11</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>4</b>
First Choice	F	E	S	E	S	F
Second Choice	E	F	E	S	F	S
Third Choice	S	S	F	F	E	E

36. Which theme is selected using the plurality-with-elimination method?

- (a) F            (b) E            (c) S            (d) There is a tie    (e) None of these

37. Which theme is selected using the Borda count method?

- (a) E            (b) S            (c) F            (d) No winner    (e) None of these

38. You decide to work part-time at a local supermarket. The job pays \$12 per hour and you work 28 hours per week. Your employer withholds 9% of your gross pay for federal taxes, 5.65% for FICA taxes, and 2.5% for state taxes. What is your weekly net pay?

- (a) \$224.85    (b) \$200.50    (c) \$278.38    (d) \$186.19    (e) None of these

39. A certain type of code displays 2 letters followed by 3 numbers. How many different types of codes are possible (repetitions of numbers and letters are allowed)?

- (a) 83            (b) 676,000    (c) 1757600    (d) 492,804    (e) None of these

40. Weights of a certain type of bird follow a normal distribution with a mean weight of 10 pounds and a standard deviation of 2 pounds. Approximately 95% of these types of birds are between \_\_\_\_\_ pounds and \_\_\_\_\_ pounds

- A) 8, 12    B) 4, 16    C) 6, 14    D) 10, 12    E) none of these

Final Exam Formula Sheet. **FEEL FREE TO TEAR OFF THIS LAST DOUBLE SIDED PAGE**

Standard Scores and Percentiles							
z-score	Percentile	z-score	Percentile	z-score	Percentile	z-score	Percentile
-3.5	0.02	-1.0	15.87	0.0	50.00	1.1	86.43
-3.0	0.13	-0.95	17.11	0.05	51.99	1.2	88.49
-2.9	0.19	-0.90	18.41	0.10	53.98	1.3	90.32
-2.8	0.26	-0.85	19.77	0.15	55.96	1.4	91.92
-2.7	0.35	-0.80	21.19	0.20	57.93	1.5	93.32
-2.6	0.47	-0.75	22.66	0.25	59.87	1.6	94.52
-2.5	0.62	-0.70	24.20	0.30	61.79	1.7	95.54
-2.4	0.82	-0.65	25.78	0.35	63.68	1.8	96.41
-2.3	1.07	-0.60	27.43	0.40	65.54	1.9	97.13
-2.2	1.39	-0.55	29.12	0.45	67.36	2.0	97.72
-2.1	1.79	-0.50	30.85	0.50	69.15	2.1	98.21
-2.0	2.28	-0.45	32.64	0.55	70.88	2.2	98.61
-1.9	2.87	-0.40	34.46	0.60	72.57	2.3	98.93
-1.8	3.59	-0.35	36.32	0.65	74.22	2.4	99.18
-1.7	4.46	-0.30	38.21	0.70	75.80	2.5	99.38
-1.6	5.48	-0.25	40.13	0.75	77.34	2.6	99.53
-1.5	6.68	-0.20	42.07	0.80	78.81	2.7	99.65
-1.4	8.08	-0.15	44.04	0.85	80.23	2.8	99.74
-1.3	9.68	-0.10	46.02	0.90	81.59	2.9	99.81
-1.2	11.51	-0.05	48.01	0.95	82.89	3.0	99.87
-1.1	13.57	0.0	50.00	1.0	84.13	3.5	99.98

TABLE 12.19 Values for Determining Correlations in a Population		
$n$	$\alpha = 0.05$	$\alpha = 0.01$
4	0.950	0.990
5	0.878	0.959
6	0.811	0.917
7	0.754	0.875
8	0.707	0.834
9	0.666	0.798
10	0.632	0.765
11	0.602	0.735
12	0.576	0.708
13	0.553	0.684
14	0.532	0.661
15	0.514	0.641
16	0.497	0.623
17	0.482	0.606
18	0.468	0.590
19	0.456	0.575
20	0.444	0.561
22	0.423	0.537
27	0.381	0.487
32	0.349	0.449
37	0.325	0.418
42	0.304	0.393
47	0.288	0.372
52	0.273	0.354
62	0.250	0.325
72	0.232	0.302
82	0.217	0.283
92	0.205	0.267
102	0.195	0.254

Example set of 52 poker playing cards

Suit	Ace	2	3	4	5	6	7	8	9	10	Jack	Queen	King
Clubs													
Diamonds													
Hearts													
Spades													

P = the principal amount invested or borrowed (present value)  
A = accumulated amount (future value)  
r = the interest rate (as a decimal)  
t = time (in years)  
n = number of compound periods per year  
PMT = loan payment

**1) Simple Interest:**

$$\text{Interest} = Prt$$

**2) Future Value (with Simple Interest):**

$$A = P + Prt$$

**3) Compound Interest -finite # of compound periods:**

(Loan or Investment)

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

**4) Compound Interest -continuous**

$$A = Pe^{rt}$$

e is approximately 2.71828 (but use e-button on calculator)

**5) Savings Formula (Annuities)**

P = deposit made at the end of each time period

$$A = \frac{P \left[ \left(1 + \frac{r}{n}\right)^{nt} - 1 \right]}{\frac{r}{n}}$$

**6) Savings formula (Annuities)**

$$P = \frac{A \left(\frac{r}{n}\right)}{\left[ \left(1 + \frac{r}{n}\right)^{nt} - 1 \right]}$$

**7) Loan Formula (Amortization Formula):**

$$PMT = \frac{P \left(\frac{r}{n}\right)}{\left[ 1 - \left(1 + \frac{r}{n}\right)^{-nt} \right]}$$