

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 THROUGH I IN "OP" PUT YOUR DAWGTAG # PUT YOUR SECTION # (See list →)

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SPECIAL CODES

850015616

05

INSTRUCTOR/DAYS IS GIVEN:

Section #	Days	Time	Instructor
02	WF	9-9:50	Daniel Davidson
03	WF	10-10:50	An Q Tran
04	TR	10-10:50	Ryan A Steele
05	TR	11-11:50	Sunil Kumar Lal Karn
11	TR	1-1:50	Gabriel E Ngwe
12	WF	1-1:50	Vina M Castelli

1. If you are given odds of 5 to 9 in favor of winning a bet, what is the probability of winning the bet?

- (A) None of these (B)  $\frac{5}{9}$  (C)  $\frac{5}{14}$  (D)  $\frac{4}{9}$  (E)  $\frac{4}{5}$

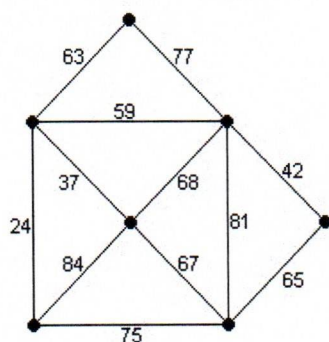
2. A number is randomly drawn from the following set: {1, 2, 3, 4, 5, 6, 7, 8}.

What is the probability that the number is greater than 8?

- (A) None of these (B)  $\frac{7}{8}$  (C)  $\frac{3}{4}$  (D)  $\frac{5}{8}$  (E)  $\frac{1}{2}$

3.

Use Kruskal's algorithm to find the minimum spanning tree for the weighted graph. Give the total weight of the minimum spanning tree.



- (A) 290 (B) 232 (C) 445 (D) None of these (E) 155  
(F)

4. A store has an item listed for \$670.00. On Saturday they are having a 25% off sale where they give a 25% discount to all items in the store. What is the sale price of this item on Saturday? Round appropriately.

- (A) None of these (B) \$167.50 (C) \$645.00 (D) \$335.00 (E) \$502.50

5. The table shows the distribution, by age and gender, 30.8 million people who live alone in a certain region. Use the data in the table to find the probability that a randomly selected person living alone in the region is in the 25-34 age range.

- (A) 0.08  
(B) 0.14  
(C) 0.18  
(D) 0.57  
(E) None of these

	Ages 18-24	Ages 25-34	Ages 35-44	Ages 45-64	Ages 65-74	Ages ≥ 75	Total
Male	0.8	2.4	2.9	4.5	1.5	1.2	13.3
Female	0.9	1.9	1.8	5.0	2.8	5.1	17.5
Total	1.7	4.3	4.7	9.5	4.3	6.3	30.8



6. Suppose your credit card has a balance of \$8,700 and an annual interest rate of 14%. You decide to pay off the balance over three years. If there are no further purchases charged to the card,

(i) How much must you pay each month? (round to the nearest dollar)  
(ii) How much total interest will you pay?

- (A) (i) \$309      (B) (i) \$309      (C) (i) \$297      (D) (i) \$297  
(ii) \$2,424      (ii) \$816      (ii) \$672      (ii) \$1,992

7. A data representation that is constructed by separating each data item into two parts based on place value is called a \_\_\_\_\_.

- A) Histogram  
B) Probability distribution  
C) Stem-and-leaf plot  
D) Frequency distribution  
E) None of these

Use the table to answer the following 2 questions. Give your answer as a reduced fraction.

The table shows the number of minority officers in a country's military in a certain year.

	Army	Navy	Marines	Air Force
African Americans	9162	3524	1341	4282
Hispanic Americans	2105	2732	914	1518
Other Minorities	4075	2653	599	3823

8. What is the probability that a randomly selected person is in the Marines?

- (A)  $1427/18364$     (B)  $1341/36728$     (C)  $3524/18309$     (D)  $1423/36728$

9. Find the probability of selecting a person who is in the Navy, given that they are African American?

- (A)  $1427/18364$     (B)  $1341/36728$     (C) None of these    (D)  $3524/18309$     (E)  $1423/36728$

10. A bank offers a CD that pays a simple interest rate of 7%. How much must you put in this CD now in order to have \$145.20 in 3 years?

- a) \$120    b) \$141    c) \$127    d) \$123    e) None of these

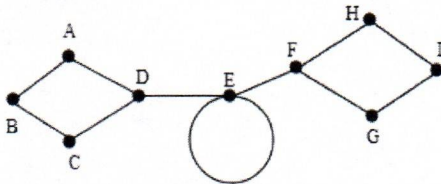
11. The price of a home is \$280,000. The bank requires a 15% down payment and two points at the time of closing. The cost of the home is financed with a 20-year fixed-rate mortgage at 6.5%. Find the amount of the mortgage.

- (A) \$42,000    (B) \$243,600    (C) None of these    (D) \$261,900    (E) \$238,000

12. A full-time employee who works 40 hours per week earns \$38,750 per year. Estimate that person's hourly income by rounding 52 weeks to 50 weeks per year, and round the annual income to the nearest thousand.

- a) \$19/hr   b) \$19.50/hr   c) \$19.38/hr   d) \$20/hr   e) None of these

13. In the following graph, what are the odd vertices?



- a) D, E, F, G  
b) D, E, F  
c) D, F  
d) None of these

14. A car rents for \$290 per week plus \$1.25 per mile. Find the rental cost for a two-week trip of 500 miles for a group of three people.

- (A) \$862.50   (B) \$4485   (C) \$915   (D) None of these   (E) \$1205

15. Most financial advisors recommend that you spend no more than 28% of your gross monthly income for your mortgage payment. Suppose that your gross annual income is \$46,800. What is the maximum amount you should spend each month on a mortgage payment?

- (A) \$2,808   (B) \$13,104   (C) None of these   (D) \$1,092   (E) \$1310.40

16. Scores on the GRE (Graduate Record Examination) are normally distributed with a mean of 556 and a standard deviation of 147. Use the 68-95-99.7 Rule to find the percentage of people taking the test who score between 262 and 556.

- (A) 49.85%   (B) 47.5%   (C) None of these   (D) 99.7%   (E) 95%

17. A game is played using one die. If the die is rolled and shows a 6, the player wins \$40. If the die shows any other number, the player wins nothing. If there is a \$8 fee to play the game, what is the expected gain/loss for a player?

- (A) -\$1.33   (B) None of these   (C) \$1.33   (D) \$0.00   (E) -\$3.00

18. A fair coin is tossed 3 times in succession. The set of equally likely outcomes is:

$\{HHH, HHT, HTH, THH, TTH, THT, HTT, TTT\}$

Find the probability of getting a tail on the second toss.

- (A) None of these   (B)  $\frac{1}{2}$    (C)  $\frac{3}{8}$    (D)  $\frac{1}{8}$    (E)  $\frac{1}{4}$



19. Use the 2016 FICA tax rates in the table below to solve the problem.

Employee's Rates	Matching Rates Paid by the Employer	Self-Employed Rates
<ul style="list-style-type: none"> <li>7.65% on first \$118,500 of income</li> <li>1.45% of income in excess of \$118,500</li> </ul>	<ul style="list-style-type: none"> <li>7.65% on first \$118,500 paid in wages</li> <li>1.45% of wages paid in excess of \$118,500</li> </ul>	<ul style="list-style-type: none"> <li>15.3% on first \$118,500 of net profits</li> <li>2.9% of net profits in excess of \$118,500</li> </ul>

If you are self-employed and earn \$126,500, what are your FICA taxes, rounded to the nearest dollar?

- (A) \$4,661      (B) \$9,181      (C) \$18,363      (D) \$19,355      (E) None of these

20. A complete graph with 15 vertices has how many Hamilton circuits?

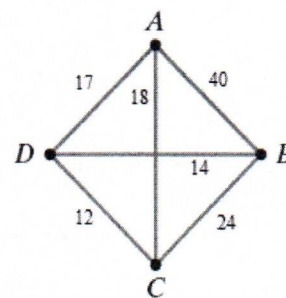
- a) 15      b) 15!      c) 14      d) 14!      e) None of these

21. Find the taxable income for a taxpayer who earned wages of \$30,800, received \$2100 in interest from a savings account, and contributed \$3400 to a tax-deferred retirement plan. The taxpayer was entitled to a personal exemption of \$4050 and had deductions totaling \$7100.

- (A) \$18,350      (B) None of these      (C) \$25,150      (D) \$22,400      (E) \$14,150

22. Use the complete weighted graph shown to find the weight of the following Hamilton circuit:

$A, B, C, D, A$



- (A) 87      (B) None of these      (C) 93      (D) 89      (E) 107

23. Use a table of z-scores and percentiles to find the percentage of data items in a normal distribution that lie between:  $z = 0.4$  and  $z = 2.6$

- (A) 34.46%      (B) 33.99%      (C) 65.54%      (D) 66.01%      (E) None of these

Use the frequency distribution to answer the next 2 questions.

Score, $x$	1	2	3	4	5	6	7	8
Frequency, $f$	2	4	6	6	6	6	2	3

24. Find the median for the data items in the frequency distribution.

- (A) 5.5      (B) 4      (C) 4.5      (D) 5      (E) None of these

25. Find the mean for the data items in the frequency distribution. Round to the nearest tenth.

- A) 4.3      B) 4.5      C) 4.0      D) 1.0      E) None of these

26. Find the value of the annuity to the nearest dollar.

**Periodic Deposit:** \$110 at the end of every six months

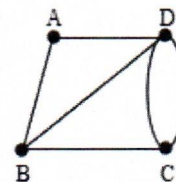
**Rate:** 4.5% compounded semiannually

**Time:** 20 years

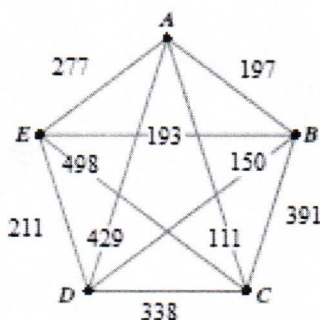
- (A) \$3451      (B) \$2782      (C) None of these      (D) \$7,016      (E) \$268

27. Does the graph have an Euler path, an Euler circuit, both, or neither?

- A) The graph has an Euler path  
B) The graph has an Euler circuit  
C) The graph has both an Euler path **and** Euler circuit  
D) The graph neither an Euler path nor an Euler circuit



28. Use the given graph and the nearest-neighbor algorithm to find a Hamilton circuit that begins at vertex A.



- a) ABCDEA  
b) ACDEBA  
c) None of these  
d) AEBCDA  
e) ACDBEA

29. What is the value of an account with an initial balance of \$8500 after 5 years if it earns 7% interest compounded monthly? Round to the nearest cent.

- (A) None of these      (B) \$11,921.69      (C) \$12,049.81      (D) \$10,419.10      (E) \$105,009.91





The theater society members are voting for the kind of play they will perform next semester: a comedy (C), a drama (D), or a musical (M). Their votes are summarized in the following preference table.

Use it to answer the following 3 questions.

Number of Votes	18	10	10	3	1	1
First Choice	M	C	D	C	D	M
Second Choice	C	M	C	D	M	D
Third Choice	D	D	M	M	C	C

~~30. Which type of play is selected by the most members?~~  
~~(A) Musical (B) Comedy (C) Drama (D) None of these~~

~~31. How many members selected Drama as their first choice?~~  
~~(A) 10 (B) None of these (C) 1 (D) 13 (E) 4~~

~~32. Which type of play was a "majority winner"?~~  
~~(A) Musical (B) Comedy (C) Drama (D) There isn't a majority winner~~

33. A tree is

- (A) Any connected graph
- (B) Any graph without circuits
- (C) Any connected graph with no circuits
- (D) Any connected graph with circuits
- (E) None of these

34. A set of data items is normally distributed with a mean of 60 and a standard deviation of 12.  
Convert 15 to a z-score.

- (A) -3.75
- (B) 3.75
- (C) 12
- (D) -12
- (E) None of these

35. You are dealt one card from a standard 52-card deck. Find the probability of being dealt an ace or a 7.

- a)  $\frac{4}{13}$
- b)  $\frac{2}{13}$
- c)  $\frac{13}{2}$
- d)  $\frac{3}{4}$
- e) None of these

36. You borrow \$9000 from a friend and promise to pay back \$9315 in 1 year. What simple interest rate, to the nearest tenth of a percent will you pay?

- (A) 3.5%
- (B) 35.0%
- (C) 1.0%
- (D) 0.35%
- (E) None of these



37. Suppose that a certain car has the following average operating and ownership costs.

Average Costs per Mile		
Operating	Ownership	Total
\$0.24	\$0.72	\$0.96

If you drive 20,000 miles per year, what is the total annual expense for this car?

- (A) \$14,400      (B) \$24,000      (C) \$19,200      (D) \$18,750      (E) None of these

Use the following data set to answer the next 2 questions.

1, 1, 1, 4, 7, 7, 7

38. Find the standard deviation. Round to the nearest hundredth.

- A) 2.85  
B) 3.00  
C) 9.00  
D) 8.14  
E) None of these

39. Find the midrange.

- (A) 1      (B) 7      (C) 6      (D) 4      (E) None of these

40. Express the fraction  $\frac{5}{8}$  as a percent. Round to one decimal place.

- a) 80.0%      b) 6.3%      c) 62.5%      d) 78.1%      e) None of these





















































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!

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

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):**

$$A = P(1 + rt) \text{ or } P = \frac{A}{(1+rt)}$$

**3) Compound Interest -finite # of compound peri**

(Loan or Investment)

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

**4) Compound Interest -continuous**

$$A = Pe^{rt}$$

$e \approx 2.71828$  (but use e-button on calculator)

**5) Savings Formula (Annuities)**

P = deposit made at the end of each time period

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

**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):**

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