1. What is the value of an account with an initial balance of $6500 after 5 years if it earns 3.6% interest compounded quarterly? Round to the nearest cent.

(A) None of these (B) $7670.00 (C) $7775.65 (D) $1275.65 (E) $7757.33

2. A store has an item listed for $48.95. On Saturday they are having a 20% off sale where they give a 20% discount to all items in the store. What is the sale price of this item on Saturday? Round appropriately.

(A) None of these (B) $58.74 (C) $9.79 (D) $28.95 (E) $39.16

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	10	6	3	6	9	5
First Choice	M	C	D	C	D	M
Second Choice	C	M	C	D	M	D
Third Choice	D	D	M	M	C	C

3. Which type of play is selected using the Borda count method?

(A) Musical (B) Comedy (C) Drama (D) None of these

4. How many members selected Drama as their first choice?

(A) 3 (B) None of these (C) 6 (D) 9 (E) 12

5. Which type of play was a "majority winner"?

(A) Musical (B) Comedy (C) Drama (D) There isn't a majority winner

6. Scores on the GRE (Graduate Record Examination) are normally distributed with a mean of 563 and a standard deviation of 142. Use the 68-95-99.7 Rule to find the percentage of people taking the test who score between 137 and 563.

(A) 49.85% (B) 47.5% (C) None of these (D) 99.7% (E) 68%

7. A game is played using one die. If the die is rolled and shows a 2, the player wins $3. If the die shows any other number, the player wins nothing. If there is a $1 fee to play the game, what is the expected gain/loss for a player?

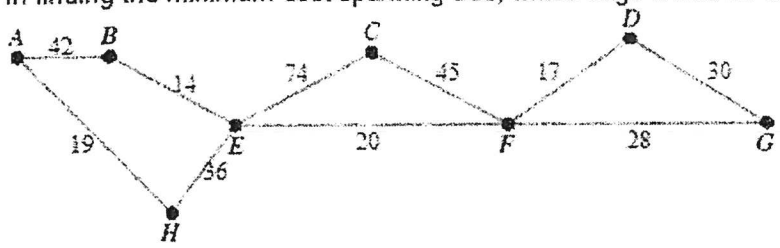
(A) $3.00 (B) None of these (C) $0.50 (D) – $0.50 (E) – $1.00

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

9. If you are given odds of 7 to 8 in favor of winning a bet, what is the probability of winning the bet?
(A) None of these (B) $\frac{7}{8}$ (C) $\frac{1}{8}$ (D) $\frac{7}{15}$ (E) $\frac{8}{15}$

10. 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 less than 7?
(A) None of these (B) $\frac{7}{8}$ (C) $\frac{3}{4}$ (D) $\frac{5}{8}$ (E) $\frac{1}{2}$

11.
In finding the minimum-cost spanning tree, which edge would be chosen 6th?

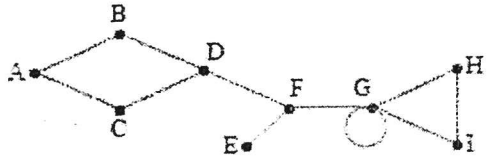


(A) FG (B) AB (C) HE (D) None of these (E) DG

12. A full-time employee who works 40 hours per week earns $25,750 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.

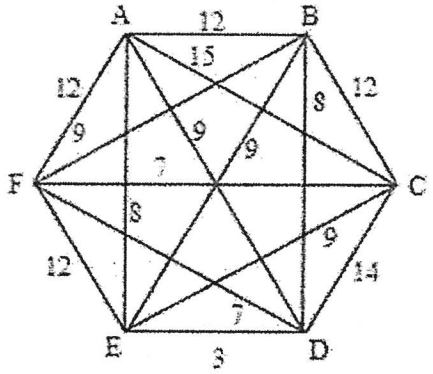
a) $13/hr b) $12.50/hr c) $12.88/hr d) $12.38/hr e) None of these

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



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

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



a) EDFCABE
b) EDFCBAE
c) None of these
d) EDBACFE
e) EDFBACE

15. Each day a small business owner sells 200 pizza slices at $1.50 per slice and 85 sandwiches at $2.50 each. Business expenses come to $130 per day.
What is the owner's profit **for a ten-day period**?

(A) $382.50 (B) $3825 (C) $217.50 (D) None of these (E) $2175

16. 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

17. The table shows the distribution, by age, of a random sample of 3650 moviegoers ages 12-74. If one moviegoer is selected from this population, find the probability, expressed as a decimal rounded to 2 places, that the moviegoer's age is at least 25.

(A) 0.23
(B) 0.80
(C) 0.20
(D) 0.57
(E) None of these

Age Distribution of Moviegoers

Ages	Number
12-24	730
25-44	830
45-64	940
65-74	1150

Use the table to answer the following 2 questions. Give your answer as a decimal rounded 2 places.

The table shows the result of a restaurant survey.

Meals	Service good	Service poor	Total
Lunch	30	15	45
Dinner	20	31	51
Total	50	46	96

18. What is the probability that a randomly selected customer had lunch?

(A) 0.31 (B) 0.33 (C) None of these (D) 0.47 (E) 0.67

19. What is the probability that a randomly selected customer said the service was good given that they had lunch?

(A) 0.31 (B) 0.33 (C) None of these (D) 0.47 (E) 0.67

Use the frequency distribution to answer the next 2 questions.

Score, x	1	2	3	4	5	6	7	8	9	10
Frequency, f	3	3	3	4	8	4	5	4	4	3

20. Find the mode for the data items in the frequency distribution.

(A) 5 (B) 6 (C) 8 (D) 10 (E) None of these

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

A) 5.0 B) 5.5 C) 5.6 D) 6.0 E) None of these

22. Suppose your credit card has a balance of $9200 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? (Use the rounded number from part i)

(A) (i) $314 (ii) $712 (B) (i) $314 (ii) $2104 (C) (i) $327 (ii) $2572 (D) (i) $327 (ii) $856

23. The price of a home is $270,000. The bank requires a 5% 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) $13,500 (B) $251,370 (C) None of these (D) $261,900 (E) $256,500

24. Most financial advisors recommend that you spend no more than 36% of your gross monthly income for your total monthly debt. Suppose that your gross **annual** income is \$108,000. What is the maximum amount you should spend each **month** for total credit obligations?

(A) \$2,520 (B) \$1,224 (C) None of these (D) \$2,016 (E) \$3,240

25. Find the value of the annuity to the nearest dollar. Periodic Deposit: \$1000 at the end of each year Rate: 4.5% compounded annually Time: 13 years

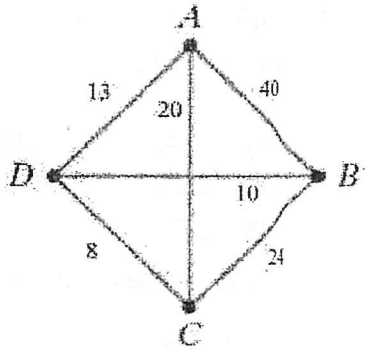
(A) \$17,160 (B) \$15,464 (C) None of these (D) \$39,382 (E) \$3,769

26. Find the taxable income for a taxpayer who earned wages of \$66,200, received \$880 in interest from a savings account, and contributed \$2,500 to a tax-deferred retirement plan. The taxpayer was entitled to a personal exemption of \$4050 and had deductions totaling \$6410.

(A) \$54,120 (B) None of these (C) \$60,530 (D) \$59,120 (E) \$64,580

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

A, D, C, B, A



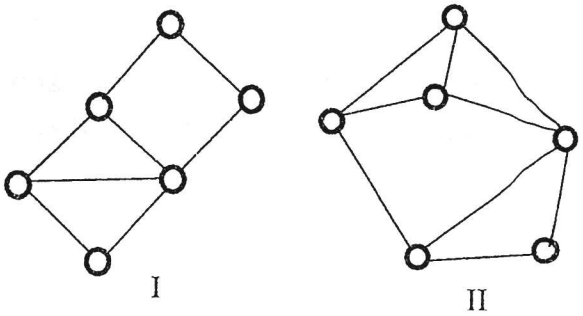
(A) 85 (B) None of these (C) 67 (D) 78 (E) 65

28. Use a table of z-scores and percentiles to find the percentage of data items in a normal distribution that lie between: $z = -2$ and $z = -0.6$

(A) 2.28% (B) 25.15% (C) 72.57% (D) 27.43% (E) None of these

29. Which graphs have an Euler circuit?

A) I only
B) II only
C) I and II
D) Neither I nor II



I II

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

14, 15, 16, 17, 18

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

A) 1.58
B) 2.50
C) 0.00
D) 1.25
E) None of these

31. Find the range.

(A) 14 (B) 16 (C) 4 (D) 18 (E) None of these

32. You borrow $1000 from a friend and promise to pay back $1615 in 3 years. What simple interest rate, to the nearest tenth of a percent will you pay?

(A) 61.5% (B) 38.1% (C) 20.5% (D) 12.7% (E) None of these

33. A data presentation with data values listed in one column and the adjacent column indicates the number of times each value occurs is called a _____.

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

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

Average Costs per Mile		
Operating	Ownership	Total
$0.28	$0.68	$0.96

If you drive 30,000 miles per year, what is the total annual expense for this car?

(A) $31,250 (B) $28,800 (C) $20,400 (D) $8,400 (E) None of these

35. Use the 2012 FICA tax rates in the table below to solve the problem.

Employee's Rates	Matching Rates Paid by the Employer	Self-Employed Rates
5.65% on first $110,000 of income	7.65% on first $110,000 paid in wages	13.3% on first $110,000 of net profits
1.45% of income in excess of $110,000	1.45% of wages paid in excess of $110,000	2.9% of net profits in excess of $110,000

If **you are self-employed** and earn $178,000, what are your FICA taxes?

(A) $23,674 (B) $16,602 (C) $12,234 (D) $7,201 (E) None of these

36. A bank offers a CD that pays a simple interest rate of 6%. How much must you put in this CD now in order to have $8,000 in 10 years?

a) $5000 b) $1143 c) $4800 d) $6143 e) None of these

37. A complete graph with 10 vertices has how many Hamilton circuits?

a) 10 b) 10! c) 9 d) 9! e) None of these

38. A set of data items is normally distributed with a mean of 240 and a standard deviation of 32. Convert 240 to a z-score.

(A) 1 (B) - 0.87 (C) 0 (D) 0.87 (E) None of these

39. A single die is rolled twice. What is the probability of rolling two sixes?

a) 1/6 b) 1/3 c) 1/36 d) 1/12 e) None of these

40. Express the fraction $\frac{3}{4}$ as a percent.

a) 0.75% b) 25.0% c) 75.0% d) 7.5% 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:

$$Interest = Prt$$

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 -continous

$$A = Pe^{rt}$$

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

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):

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