

Prob/Stat/Discrete
Practice Final

Name _____

- 1) Find $P(z < -2.10)$

☒ a) 0.0179
b) 0.9821
c) 0.9778
d) 0.0222

$$ncdf(-10000, -2.10, 0, 1) = 0.01786$$

- 2) In a recent year, the sophomore class taking the Nevada High School Proficiency Mathematics exam had a mean score of 330 with a standard deviation of 34. Assume that the scores are normally distributed. Find the probability that a student had a score higher than 303.

a) 0.2136
b) 0.1567
☒ c) 0.7864
d) 0.8433

$$ncdf(303, 1000, 330, 34) = 0.78643$$

- 3) A normal distribution has a mean of 65.1 and a standard deviation of 12.3. Find the probability of an x value less than 35.5.

a) 0.9542
b) 0.0458
c) 0.9919
☒ d) 0.0081

$$ncdf(-1000, 35.5, 65.1, 12.3) = 0.00805$$

- 4) The average number of hours per week a high school student watches television is 12.5 hours, with a standard deviation of 2.4 hours. Find the probability of a student watching between 10.6 and 13.8 hours of television.

a) 0.3257
b) 0.6743
c) 0.5083
☒ d) 0.4917

$$ncdf(10.6, 13.8, 12.5, 2.4) = 0.49169$$

- 5) Find $P(z > -0.74)$

☒ a) 0.7704
b) 0.2296
c) 0.1251
d) 0.8749

$$ncdf(-0.74, 10000, 0, 1) = 0.77035$$

- 6) The area to the right of a z-score is 0.5871. What is the z-score?

a) 0.78
b) 0.22
c) -0.78
d) -0.22

$$\text{invnorm}(1-0.5871, 0, 1) = -0.2200$$

- 7) The probability of being lower than a specific z-score is 4.9%. What is the value of the z-score?

a) -1.65
b) 1.65
c) -0.03
d) 0.03

$$\text{invnorm}(0.049, 0, 1) = -1.6546$$

- 8) What z-score is at the 60th percentile?

a) 0.25
b) -0.25
c) 0.75
d) -0.75

$$\text{invnorm}(0.60, 0, 1) = 0.2533$$

- 9) SAT English scores are normally distributed with a mean score of 690 and a standard deviation of 75. What score is at the 80th percentile?

a) Around 753
b) Around 754
c) Around 761
d) Around 765

$$\text{invnorm}(0.8, 690, 75) = 753.12$$

- 10) The mean home price in Reno is \$354,889, with a standard deviation of \$45,600. 45% of the homes in Reno are more expensive than John's home. What is the price of John's home?

a) \$299,414.51
b) \$355,481.97
c) \$360,619.16
d) \$375,577.23

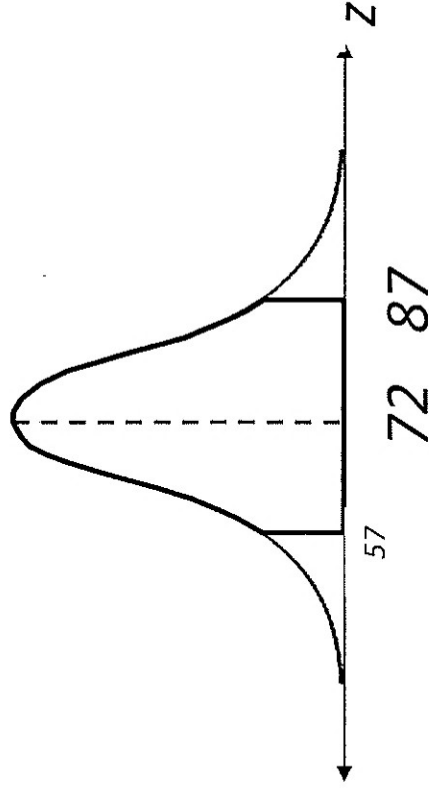
$$\text{invnorm}(1-0.45, 354889, 45600) = 360619.157$$

- 11) The speeds of vehicles along a stretch of highway are normally distributed, with a mean of 72 miles per hour and a standard deviation of 7 miles per hour. Find the speed x corresponding to a z-score of 1.96.

a) 79.37
b) 84.26
c) 78.83
d) 85.72

$$x = z \cdot \sigma + \mu$$

- 12) Estimate the standard deviation of the normal curve shown below.



- a) 72 ☒ b) 15 c) 30 d) 57

- 13) Scores for the ASVAB (Armed Services Vocational Aptitude Battery) test are normally distributed, with a mean of 88 and a standard deviation of 4.9. To be eligible to join the military, you must score in the top 25%. What is the lowest score you can earn and still be eligible to enlist?

- a) 88
b) 91
☒ c) 92
d) 95

$$\text{invnorm}(1-0.25, 88, 4.9) = 91.3$$

$$\text{invnorm}(0.01, 0.1) = 2.32 \quad E = \frac{Z \cdot \sigma}{\sqrt{n}}$$

- 14) A random sample of 150 students has a grade point average with a standard deviation of 0.78. Find the margin of error if $c = 0.98$.

- ☒ a) 0.15 b) 0.08 c) 0.11 d) 0.12

$$= 0.1977$$

- 15) In order to set rates, an insurance company is trying to estimate the number of sick days that full time workers at an auto repair shop take per year. A previous study indicated that the standard deviation was 2.8 days. How large a sample must be selected if the company wants to be 95% confident that the true mean differs from the sample mean by no more than 1 day?

$$\left(\frac{1.96 \cdot 2.8}{1} \right)^2 \quad n = \left(\frac{Z \cdot \sigma}{E} \right)^2$$

- a) 141 b) 1024 ☒ c) 1 d) 512

- 16) A random sample of 80 students has a test score with $\bar{x} = 79.5$ and $s = 12.5$. Construct the confidence interval for the population mean, μ if $c = 0.90$.

- a) (74.9, 86.3)
c) (76.4, 82.5) ☒ b) (77.2, 81.8) d) (75.3, 80.6)

Z interval

$$(77.201, 81.799)$$

- 17) A group of 35 bowlers showed that their average score was 225 with a standard deviation of 12. Find the 95% confidence interval of the mean score of all bowlers.

a) (219, 227)
c) (226, 234)

b) (220, 224)
d) (221, 229)

2 interval

$$(221.02, 228.98)$$

- 18) Construct a 95% confidence interval for the population mean, μ . Assume the population has a normal distribution. In a recent study of 21 seniors, the mean number of hours per week that they spent doing homework was 17.1, with a standard deviation of 6.7 hours.

a) (14.6, 19.6)

c) (14.1, 20.2)

d) (12.9, 21.3)

$$(14.05, 20.15)$$

- 19) The standard IQ has a mean of 100 and a standard deviation of 7. We want to be 95% certain that we are within 3 IQ points of the true mean. Determine the required sample size.

a) 153

c) 21

d) 97

$$n = \left(\frac{z_{\alpha/2} \cdot \sigma}{E} \right)^2$$

$$\left(\frac{1.96 \cdot 7}{3} \right)^2$$

Use the data for home prices for # 20 – 25.

Price (Thousands of \$)	\$140	\$170	\$190	\$220	\$240	\$260	\$280
Sales of New Homes This Year	136	114	94	75	82	40	20

$$a = -0.774$$

$$b = 246.16$$

$$r^2 = 0.937$$

$$r = 0.968$$

- 20) Find the equation of the regression line.

$$\hat{y} = -0.79x + 249.86a)$$

$$\hat{y} = 246.16x + 0.77b)$$

$$\hat{y} = -0.68x + 232.57c)$$

$$\hat{y} = -0.77x + 246.16d)$$

- 21) What is the value of the correlation coefficient, r ?

a) 0.94

b) -0.97

c) -0.95

d) 0.82

$$r = -0.77(300) + 246.16$$

- 22) Predict the number of new homes sold at a price of \$300,000.

a) around 15

b) around 16

c) around 13

d) around 12

$$300 = -0.77x + 246.16$$

- 23) 200 homes are sold this year at a certain price. Use the regression line to estimate the price.

a) around \$81,860

b) around \$74,502

c) around \$62,394

d) around \$59,948

- 24) Find the residual value for a home priced at \$240,000.

a) 19.74

b) -19.74

c) 20.64

d) -20.64

$$82 - (-0.77(240) + 246.16) = 20.64$$

- 25) What percentage of the variation in the data can be explained by the regression line?

a) 94%

b) 97%

c) 79%

d) 83%

26) A collection of a set of data (x) has a mean 14 with a standard deviation of 2.4. Another variable (y) has a mean of 28 with a standard deviation of 5. The correlation coefficient is -0.94. Find the equation of the linear regression line.

- a) $\hat{y} = -1.96x + 55.44$
 b) $\hat{y} = 1.96x + 0.56$
 c) $\hat{y} = -0.45x + 34.3$
 d) $\hat{y} = 0.45x + 21.7$

$$a = r \frac{S_y}{S_x} \quad b = \bar{y} - a\bar{x} \quad 28 - (-1.96)14$$

$$\bar{x} = 14 \quad a = -0.94 \frac{5}{2.4} = -1.958 \quad b = 55.44$$

$$S_x = 2.4 \quad \bar{y} = 28$$

$$S_y = 5 \quad r = -0.94$$

27) Jack and Sara borrow \$20,000 for a down payment on their house. The loan is calculated at a simple interest rate of 8%. If they pay back the loan in 10 months, how much interest will they pay?

- a) \$21,474,836.48 b) \$1,600 c) \$1,333.33 d) \$1,300

$$I = Prt \quad 20000(0.08)\left(\frac{10}{12}\right)$$

28) An investment is made of \$5000, and the future value of the investment is \$5750 after two years. Find the simple interest rate of the investment.

- a) 0.75 b) 7.5% c) 0.15 d) 1.5%

$$A = P(1 + rt) \quad 5750 = 5000(1 + 2r)$$

Use the following for #29 and 30: John's parents open a bank account on his 3rd birthday. They put \$2000 in the account, which has an interest rate of 6.5% compounded monthly.

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

29) How much money will be in the account on John's 18th birthday?

- a) \$5,288.40 b) \$5,177.30 c) \$6,345.20 d) \$6,545.23

30) How much interest was earned over the life of the investment?

- a) \$3,177.30 b) \$4,345.20 c) \$3,288.40 d) \$4,545.23

31) Heidi would like to save \$20,000 so that she can make a down payment on a home. How much should she invest in an account with 9% interest that is compounded monthly, so that she can reach her goal in five years?

- a) \$12,750.23 b) \$12,780.21 c) \$12,725.32 d) \$12,773.99

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

32) In order to save for retirement, Brandon makes a periodic deposit of \$350 into an account that earns an interest rate of 4.5% compounded quarterly. How much money will be in this account after 20 years?

- a) \$45,263.33 b) \$45,002.63 c) \$45,026.33 d) \$45,062.33

$$A = 350 \left[\left(1 + \frac{0.045}{4} \right)^{4 \cdot 20} - 1 \right]$$

$$\left(\frac{0.045}{4} \right)$$

For #33, use the stock table for Netflix.

52 week high	52 week low	Stock	Sym	Div	Yld%	PE	Vol 100s	Hi	Lo	Close	Net Chg
28	12	NTF	ICR	0.43	1.7	22	9420	28	26.5	25	...

33) What is the volume of shares sold for Netflix?

- a) 942,000 b) 9,420 c) 22 d) 2,200

34) The cost of new seating is \$2600. We can finance this by paying \$600 down and \$215.21 per month for 12 months. Determine the finance charge.

a) \$682.25

b) \$582.52

c) \$585.32

d) \$625.82

$$600 + 215.21 \cdot 12 = 3182.52 - 2600$$

35) A particular credit card calculates interest using the unpaid balance method. The monthly interest rate is 3.62% on the unpaid balance on the first day of the billing period less payments and credits. Here are some of the details in the July 1-July 31 itemized billing.

July 1 Balance; \$1250

Payment Received July 10: \$400

Purchases Charged to the VISA Account: Dinner, \$54; Car repair, \$310; Clothing, \$230

Last day of the billing period: July 31

Payment Due Date: August 9

$$(1250 - 400)(0.0362)$$

The monthly payment is calculated in the following way: If the balance is less than \$600, the monthly payment is \$15. If the balance is more than \$600, the monthly payment is $\frac{1}{36}$ of the total balance on the account, rounded to the nearest dollar. Find the amount of the minimum monthly payment.

a) \$39

b) \$40

c) \$41

d) \$42

48,000

For #36 - 37: The price of a home is \$240,000. The bank requires a 20% down payment. After the down payment, the balance is financed with a 30-year fixed-rate mortgage at 6.5%.

36) Determine the monthly mortgage payment to the nearest dollar.

- a) \$1,312.57 b) \$1,313 c) \$1,213.57 d) \$1,214

$$\frac{192000(0.065)}{12} \div \left(1 - \left(\frac{0.065}{12}\right)^{-360}\right)$$

37) How much interest will be paid during the life of the mortgage?

- a) \$280,680 b) \$280,525.20 c) \$245,040 d) \$244,885.20

$$1214 \times 360 = 437040$$

$$437040 - 192000 = 245040$$

38) How long will it take an investment of \$3000 at 5% compounded continuously to grow to \$6000?

- a) 13 years b) 13.86 years c) 15 years d) 15.34 years

$$6000 = 3000e^{0.05t}$$

$$2 = e^{0.05t}$$

$$\ln 2 = 0.05t$$

39) Solve the following inequality: $-6 \leq \frac{1}{2}x - 4 < -3$

- a) $-5 \leq x < -3.5$ b) $-4 \leq x < -2$ c) $-1 \leq x < 0.5$ d) $-2.5 \leq x < 1.5$

$$\frac{-6 \leq \frac{1}{2}x - 4 < -3}{+4} \Rightarrow \frac{-2 \leq \frac{1}{2}x < 1}{\times 2} \Rightarrow -4 \leq x < 2$$

40) At Rhonda's diner, five loaded baked potatoes and four cheeseburgers provide 4830 calories.

One loaded baked potato and four cheeseburgers provide 2630 calories. Find the calorie content of each item.

$$\begin{array}{r} 5x + 4y = 4830 \\ -1x + 4y = 2630 \\ \hline 4x = 2200 \\ x = 550 \end{array}$$

- a) potato: 520 calories, cheeseburger: 550 calories
 b) potato: 550 calories, cheeseburger: 520 calories
 c) potato: 580 calories, cheeseburger: 500 calories
 d) potato: 500 calories, cheeseburger: 580 calories

- 41) When making a long distance call from a certain pay phone, the first three minutes of a call cost \$1.40. After that, each additional minute or portion of a minute of that call costs \$0.35. Find the maximum number of minutes one can call long distance for \$6.30.

$$\begin{array}{r} 1.40 + 0.35(x-3) = 6.30 \\ -1.40 \\ \hline 0.35(x-3) = 4.90 \\ \underline{0.35} \quad 0.35 \\ x-3 = 14 \end{array}$$

- a) 15 minutes b) 16 minutes **c) 17 minutes** d) 18 minutes

- 42) Chelsea has nickels, dimes, and quarters in her coin purse. She has a total of \$1.65 from 12 coins. The number of quarters is one more than the number of nickels. The number of dimes is one more than the number of quarters. How many nickels did she have?

$$\begin{array}{l} \text{nickels} = x \\ \text{dimes} = x+2 \\ \text{quarters} = x+1 \end{array} \quad \begin{array}{l} (0.05x + 0.10(x+2) + 0.25(x+1)) = 1.65 \\ 5x + 10x + 20 + 25x + 25 = 1.65 \\ 40x + 45 = 1.65 \end{array}$$

- a) 3 nickels** b) 4 nickels c) 5 nickels d) 6 nickels $x = 3$

- 43) Solve using the substitution method:

$$x + 5y = 107$$

$$y = 6x + 9$$

$$\begin{array}{r} x + 5(6x+9) = 107 \\ x + 30x + 45 = 107 \\ \underline{-45 - 45} \\ 31x = 62 \\ x = 2 \end{array} \quad \begin{array}{r} y = 6 \cdot 2 + 9 \\ y = 12 + 9 \\ y = 21 \end{array}$$

- a) (3, 27) **b) (2, 21)** c) (-2, -3) d) (-3, -9)

- 44) On a buying trip in Los Angeles, Rosaria Perez ordered 120 pieces of jewelry: a number of bracelets at \$7 each and a number of necklaces at \$15 each. She wrote a check for \$1320 to pay for the order. How many bracelets and how many necklaces did Rosaria purchase?

$$\begin{array}{r} x + y = 120 \\ 7x + 15y = 1320 \\ \underline{-7x - 7y = -840} \\ 8y = 480 \\ y = 60 \end{array}$$

- a) 70 bracelets and 50 necklaces b) 55 bracelets and 65 necklaces
c) 60 bracelets and 60 necklaces d) 64 bracelets and 56 necklaces

45) Solve the following system by graphing:

$$4x - 2y = -8 \quad (-2, 0) \quad (0, 4)$$

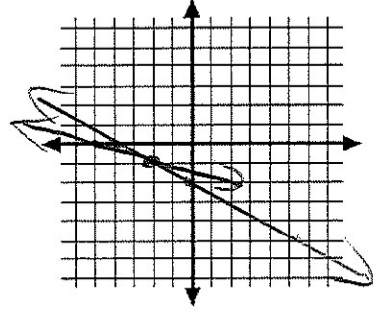
$$y = 3x + 5$$

a) $(-2, 1)$

b) $(1, 3)$

c) $(-3, 2)$

d) $(-1, 2)$



46) Which of the following is the correct system of inequalities for the graph shown?

a) $y \geq 3x + 3$

$x + y \leq -1$

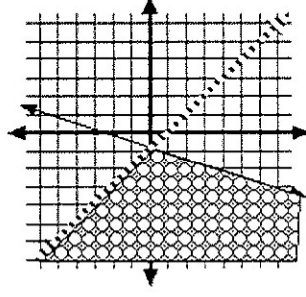
b) $y > 3x + 3$

$x + y > -1$

c) $y \leq 3x + 3$

$x + y \geq -1$

d) $y \geq 3x + 3$
 $x + y < -1$



Use the following word problem for #47 – 50:

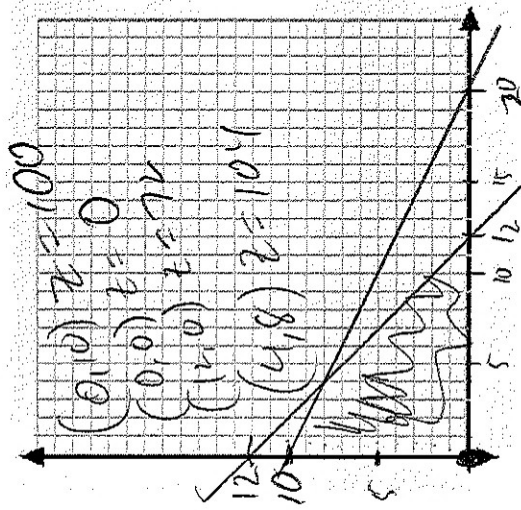
The Discrete quiz consists of computation problems and graphing problems. Computation problems are worth 6 points each, and graphing problems are worth 10 points each. You can answer a computation problem in 2 minutes and a graphing problem takes 4 minutes. You have 40 minutes to take the quiz and may choose no more than 12 problems to answer. Let x equal the number of computation problems that a student gets correct. Let y equal the number of graphing problems a student gets correct on the quiz.

$$Z = 6x + 10y$$

$$\begin{aligned} 2x + 4y &\leq 40 & x &\geq 0 \\ x + y &\leq 12 & y &\geq 0 \end{aligned}$$

47) What is the objective function for this situation?

- a) ☒ $Z = 6x + 10y$ b) $Z = 2x + 4y$ c) $Z = 40x + 12y$ d) none of these



48) Which of the following inequalities is NOT one of the constraints for this situation?

- a) $x + y \leq 12$ b) ☒ $6x + 10y \geq 40$ c) $2x + 4y \leq 40$ d) $x \geq 0$

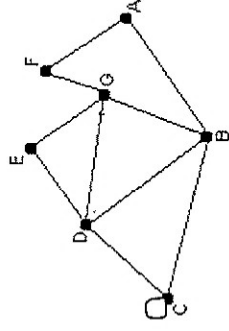
49) Which of the following is NOT one of the vertices of the polygon formed by the constraints?

- a) (12, 0) b) (4, 8) c) (0, 10) d) ☒ (0, 20)

50) Assuming you get all the problems you do correct, how many of each type should you answer to get the highest number of points?

- a) 12 computational b) 12 graphing c) 10 graphing d) ☒ four computational and eight graphing

For # 51 – 53, use the graph shown.



51) Is the graph complete? Is it connected?

a) yes/yes b) yes/no **c) no/yes** d) no/no

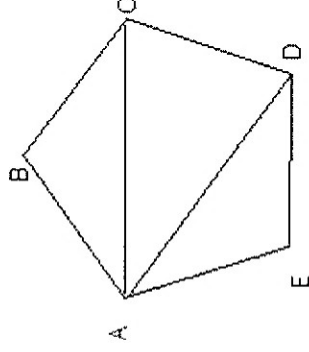
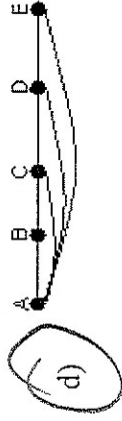
52) Is the edge DG is a bridge?

a) yes **b) no** c) maybe d) I have no idea lol ☺

53) Find the degree of vertex C.

a) 4 b) 3 c) 5 d) 6

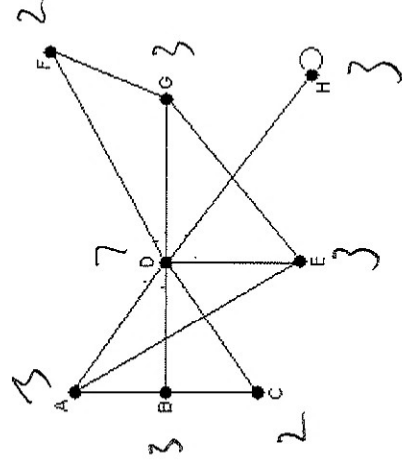
54) Which of the following graphs is equivalent to the one shown?



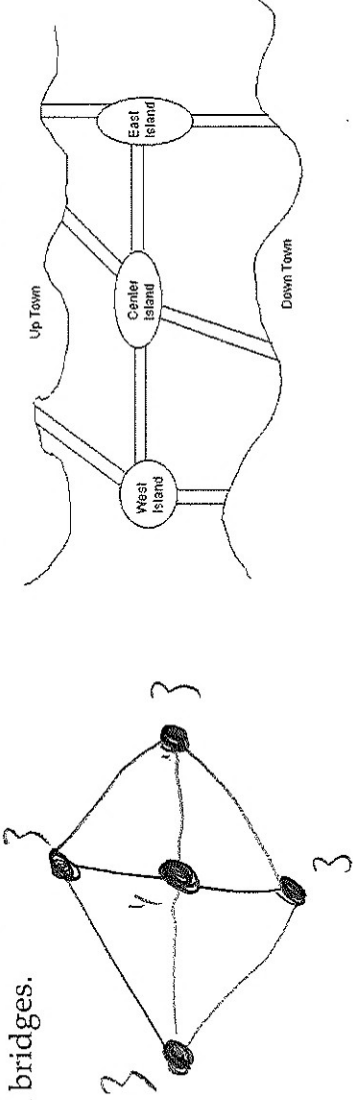
55) Does the graph have an Euler Path, an Euler Circuit, or neither?

a) Euler Path b) Euler Circuit

c) Neither



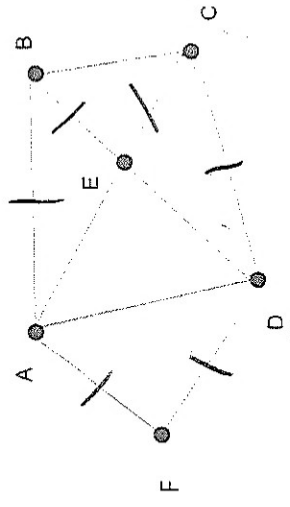
- 56) The layout of a city with land masses and bridges is shown. Draw a graph to model the land masses and bridges.



Determine if the city residents would be able to walk across all of the bridges (starting on either bank) without crossing the same bridge twice. Explain.

- a) yes, two odds b) no, more than two odds c) yes, all evens d) no

- 57) For the graph shown, F D C E B A F is best described as an Euler Circuit, an Euler Path, a Hamilton Path, or a Hamilton Circuit?

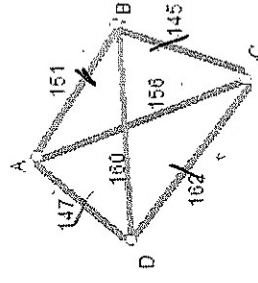


- a) Euler Circuit b) Euler Path c) Hamilton Path d) Hamilton Circuit

- 58) A complete graph has 6 vertices. How many Hamilton Circuits exist?

- a) a lot b) 720 c) 120 d) too many

- 59) A restaurant chain has four different locations in different cities, A, B, C, and D, as shown. The manager needs to start at the location in city C, visit each restaurant, and return to city C. Use the Nearest Neighbor Algorithm, starting at vertex C, to find the optimal circuit and its weight.



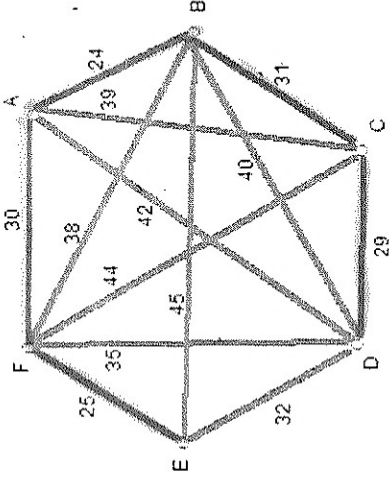
- a) 629 b) 605 c) 595 d) 602

$$145 + 151 + 147 + 162$$

60) True or False? A spanning tree is a subgraph that contains all of a connected graph's vertices, is connected, and contains no circuits.

- a) true b) false

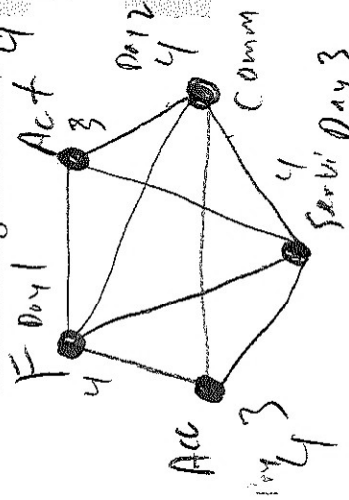
61) A new residential neighborhood is built, and telephone lines need to be built in order to connect all of the homes. Use Kruskal's algorithm to find the minimum amount of telephone line needed.



$$24 + 25 + 29 + 30 + 31$$

- a) 123 b) 139 c) 145 d) 129

62) Suppose that 4 Student Leadership committees all want to meet during lunchtime.



	Fundraising	Activities	Communication	Service	Accounting
Amy	X		X		X
Heather	X	X		X	
Sara			X	X	X
Amber	X	X	X		

What is the least number of days required for all committees to meet without out any scheduling conflicts?

- a) 2 b) 3 c) 4 d) 5

63) Express each expanded form as a Hindu-Arabic numeral:
 $(7 \times 10^5) + (0 \times 10^4) + (6 \times 10^3) + (9 \times 10^2) + (5 \times 10^1) + (3 \times 1)$

- a) 543,211 b) 76,951 c) 706,951 d) 706,953

64) If the Babylonian numeral V stands for 1 and the Babylonian numeral < stands for 10, then write the Babylonian numeral as a Hindu-Arabic numeral: $VVV <VV VVV$

$$360^2 + 1260 + 360^0$$

- a) 11,325 b) 11,253 **c) 11,523** d) 11,532

65) Use the table to write the Mayan number as a Hindu-Arabic numeral.

••••• $4,2018$

•• $12,20$

○ 0.1

- a) 1,580 **b) 1,680** c) 1,608 d) 1,508
 $3,6^3 + 2.6^2 + 0.6^1 + 5.6^0$

66) Convert the number to base ten: 3205_{six}

- a) 725** b) 625 c) 752 d) 652

$$2 \cdot 8^1 + 2 \cdot 8^3 + 4 \cdot 8^2 + 4 \cdot 8^1 + 1 \cdot 8^0$$

67) Convert the number to base ten: 22441_{eight}

- a) 9,550 b) 8,505 **c) 9,505** d) 8,550

68) Convert the base ten numeral 125 to base three.

- a) 1122_{three} b) 11112_{three} c) 11222_{three} **d) 11122_{three}**

69) Add in the indicated base:

$$\begin{array}{r} 32_{\text{four}} \\ + 12_{\text{four}} \\ \hline 110 \end{array}$$

- a) 111_{four} b) 112_{four} **c) 110_{four}** d) 113_{four}

70) Multiply in the indicated base: 45_{five}

$$\begin{array}{r} 44 \\ \times 45_{\text{five}} \\ \hline 400 \end{array}$$

- a) 400_{five}** b) 401_{five} c) 500_{five} d) 405_{five}

0	1	2	3	4
○	•	••	•••	••••
5	6	7	8	9
—	•	••	•••	••••
10	11	12	13	14
—	•	••	•••	••••
15	16	17	18	19
—	•	••	•••	••••

$$\begin{array}{r} 81 \overline{) 25} \quad 1 \quad 1 \quad 1 \\ 81 \overline{) 25} \quad 21 \overline{) 44} \quad 9 \overline{) 17} \\ 81 \overline{) 25} \quad 81 \overline{) 27} \quad 9 \overline{) 17} \\ 81 \overline{) 25} \quad 81 \overline{) 27} \quad 9 \overline{) 17} \\ 81 \overline{) 25} \quad 81 \overline{) 27} \quad 9 \overline{) 17} \end{array}$$

$$\begin{array}{r} 2 \quad 2 \\ 3 \overline{) 8} \quad 1 \overline{) 2} \\ 3 \overline{) 8} \quad 1 \overline{) 2} \\ 3 \overline{) 8} \quad 1 \overline{) 2} \end{array}$$