

Name Kelly Date 5/29/18

Teacher: TROICI

# Bellmore-Merrick Central High School District

## Final Examination Discrete Math

Day 1

June 2017

**Part I:** Answer 10 out of the following 12 questions from this part. Each correct answer will receive 2 credits. Partial credit will not be awarded. Write the word "OMIT" on the space of the two questions not answered.

- |             |             |             |              |
|-------------|-------------|-------------|--------------|
| 1. <u>C</u> | 4. <u>b</u> | 7. <u>b</u> | 10. <u>a</u> |
| 2. <u>b</u> | 5. <u>a</u> | 8. <u>b</u> | 11. <u>b</u> |
| 3. <u>d</u> | 6. <u>b</u> | 9. <u>C</u> | 12. <u>C</u> |

The declaration should be signed when you complete the exam.

I hereby affirm, at the close of the examination, that I had no unlawful knowledge of the questions or answers prior to the examination, and I have neither given nor received assistance in answering any of the questions during the examination.

Venn Diagrams 0%  
Signature  
Unit + Price 17%  
~~Gamma notation/matrices~~ 25%  
Patterns 17%  
Life Skills/Budgeting/salary 33%  
Area: 8%

Do not write in this box

Day 1 Score: \_\_\_\_\_

Bellmore-Merrick Central High School District  
Final Examination  
Discrete Math – Day 1 – June 2017

**Part 1: Answer 10 out of the following 12 questions from this part.** Each correct answer will receive 2 credits. Partial credit will not be awarded. Write the word "OMIT" on the space of the two questions not answered. [20]

Solve for  $x$ :  $81^x = 243$

- a) 1                      c) 1.25  
b) 1.5                    d) 1.75

2. When reviewing an advertisement for an apartment, the abbreviation CAC stands for:

- a) close for all commuters  
b) central air conditioning  
c) cats are considered  
d) carry all costs

3. Determine the next term according to the pattern  $-15, -9, -3, \underline{\hspace{1cm}}$

- a) -9                      c) 0  
b) 1                        d) 3

+6  
+6

4. Evaluate:  $\sum_{x=1}^5 (x+1)$

- a) 10                      c) 30  
b) 20                      d) 25



Find the determinant of:

$$\begin{vmatrix} 1 & 3 \\ -2 & 4 \end{vmatrix}$$

$$(1)(4) - (3)(-2)$$

$$4 - -6$$

$$10$$

a) 10

b) -24

c) 6

d) -2

6. You purchase 15.5 ounces of coffee. The item price is \$5.99. How much is the unit price?

a) \$5.52

b) \$0.39

c) \$92.85

d) \$0.38

$$\frac{5.99}{15.5} = .39$$

7. A circular table has a diameter of 6 feet.  $r = 3$   
What is the area of the table, to the *nearest hundredth*?

a) 18.84 sq. ft.

b) 28.27 sq. ft.

c) 113.04 sq. ft.

d) 9.42 sq. ft.

$$A = \pi r^2$$

$$A = 28.27$$

8. The Smith family has a net income of \$3700. Their living expenses are \$1232, fixed expenses are \$1399, and monthly share of annual expenses are \$525. Based on this information the Smith family is:

a) over budget by \$544.00

b) under budget by \$544.00

c) over budget by \$3156.00

d) exactly on budget

$$3700 - (1232 + 1399 + 525) = 544$$

9. Dan sold a house this week for \$954,265. He makes 4.25% of all his sales and he makes a salary of \$1250 per week. How much does Dan make for the week?

- a) \$406,812.63      c) \$41,806.26  
b) \$4,056,876.25      d) \$4,054,376.25

$$\begin{array}{r} 954265 \times 0.0425 = \\ 40556.26 \\ + 1250 \\ \hline 41806.26 \end{array}$$

10 Evaluate:  $\sum_{n=1}^4 (2n+3)$

- a) 32      c) 16  
b) 5      d) 11

11. You purchase 12 ounces of soda at a price of \$1.32. What is the unit price per ounce?

- a) \$15.84      c) \$0.12  
b) \$0.11      d) \$1.32

$$\begin{array}{r} 1.32 \\ 12 \\ \hline .11 \end{array}$$

12. Jacob's gross pay is \$4,500. How much is his net pay if the Federal government takes 27% out in taxes?

- a) \$5,715      c) \$3,285  
b) \$4,527      d) \$1,215

$$\begin{array}{r} 4500 \times 0.27 = 1215 \\ - 1215 \\ \hline 3285 \end{array}$$



**Part 4: Show ALL work in the answer booklet. Answer 2 of the following 3 questions from this part.** Use the space and the graphs provided to show work and sketches. Each correct answer will receive 10 credits. [20]

13. Joe's bedroom is 18 feet long by 11 feet wide. He is going to buy a bed that is 6 feet long by 4 feet wide, a desk that is 4 feet long by 3 feet wide, and a dresser that is 5 feet long by 3.5 feet wide.

a. How much unused space is there in the room?

$$\begin{array}{r}
 A_{\text{BIG}} = 18 \times 11 = 198 \\
 - \\
 A_{\text{small}} = \begin{array}{r} 6 \times 4 = 24 \\ 4 \times 3 = 12 \\ 5 \times 3.5 = +17.5 \\ \hline 53.5 \end{array} \\
 \hline
 198 - 53.5 = \boxed{144.50} \text{ ft}^2
 \end{array}$$

b. If the bed cost \$1685, the desk costs \$299, the dresser costs \$499 and the sales tax is 8.625%, what is the total cost to furnish the room?

$$\begin{array}{r}
 1685 \\
 + 299 \\
 + 499 \\
 \hline
 2483 \times .08625 = 214.16
 \end{array}$$

$$2483 + 214.16 =$$

$$\boxed{\$2697.16}$$



14. Joe and Carey Smith have a combined monthly net income of \$5,000.  
Use their budget sheet to answer the questions on the following page.

| A MONEY MANAGER FOR: The Smith's for October |                |                                      |                                 |
|--|----------------|--------------------------------------|---------------------------------|
| <b>Monthly Living Expenses</b>               |                | <b>Monthly Fixed Expenses</b>        |                                 |
| Food/Grocery Bill:                           | \$312.93       | Mortgage Payment                     | \$2,627.35                      |
| <u>Household Expenses:</u>                   |                | Car Payment                          | \$250.65                        |
| Electricity                                  | \$34.21        | Regular Savings                      | \$250.00                        |
| Heating Fuel                                 | \$61.20        | Emergency Fund                       | \$250.00                        |
| Water  | \$35.75        |                                      |                                 |
| Total Household Expenses:                    | 131.16         | <b>TOTAL MONTHLY FIXED EXPENSES:</b> |                                 |
| <u>Transportation:</u>                       |                |                                      | 3378                            |
| Gasoline/Oil                                 | \$156.22       |                                      |                                 |
| Parking                                      | \$42.00        |                                      |                                 |
| Commuting                                    | \$260.00       |                                      |                                 |
| Total Transportation Expenses:               | 458.22         |                                      |                                 |
| <u>Personal Spending:</u>                    |                | <b>Annual Expenses</b>               |                                 |
| Clothing                                     | \$75.45        | Life Insurance                       | \$1,235.70                      |
| Newspapers, Gifts                            | \$22.56        | Home Insurance                       | \$1,188.90                      |
| Pocket Money                                 | \$50.00        | Car Insurance                        | \$1,650.00                      |
| Total Personal Spending:                     | 148.01         | Real Estate Taxes                    | \$2,560.45                      |
| <u>Entertainment</u>                         |                | Car Registration                     | \$125.00                        |
| Movies/Theatre                               | \$25.00        | Contributions                        | \$400.00                        |
| Dining Out                                   | \$125.00       |                                      |                                 |
| Total Entertainment:                         | 150.00         | <b>TOTAL ANNUAL EXPENSES:</b>        |                                 |
|  |                |                                      | 7160.05                         |
| <b>TOTAL MONTHLY LIVING EXPENSES:</b>        |                | <b>Monthly Share</b>                 |                                 |
|  | 1200.32        | (÷12)                                | 596.67                          |
| <b>Monthly Balance Sheet</b>                 |                |                                      |                                 |
| Living Expenses:                             | 1200.32        | *                                    |                                 |
| Fixed Expenses:                              | 3378           | *                                    | Net Income: 5000                |
| Annual Expenses (per month):                 | 596.67         | *                                    |                                 |
| <b>Total Monthly Expenses:</b>               | <u>5174.99</u> | *                                    | Total Monthly Expenses: 5174.99 |
|  |                | *                                    |                                 |
|  |                | *                                    | Balance: -174.99                |
|  |                | *                                    |                                 |
|  |                | *                                    |                                 |

Complete the table above and answer the questions on the following page →



Question 14, continued.

Answer the following questions based on the budget sheet on the previous page:

|   |  |
|---|--|
| 14a. What is the total of their monthly living expenses?<br><br>\$ 1200.32  | 14b. What is the total of their monthly fixed expenses?<br><br>\$ 3378   |
| 14c. What is the total of their annual expenses?<br><br>\$ 7160.05  | 14d. What is the monthly share of their annual expenses?<br><br>\$ 596.67  |
| 14e. What is the total of their monthly expenses?<br><br>5174.99  | 14f. Are the Smith's living within their monthly net income?<br><br>NO! 174.99 over                              |
| 14g. The Smith's receive pay <u>raises</u> that increase their net income by 5 percent. What is their new combined monthly net income?<br><br>$5000 \times .05 = 250$<br>$5000 + 250 = 5250$  | 14h. Can the Smith's meet their total monthly expenses with their new monthly income?<br><br>yes! under by 75.01 |
| 14i. If you have the same budget and the same net income as the Smith's had before they received their pay increases, on what items would you try to reduce your spending in order to live within your monthly net income?<br><br>Entertainment |  |

15. Complete the time card below for Leanne Smith

### Time Card

**Employee:** Smith, Leanne

**Social Security No:** 590-94-508

| Day       | IN       | OUT      |     | IN      | OUT     |     | TOTAL HOURS |
|-----------|----------|----------|-----|---------|---------|-----|-------------|
| Monday    | 9:00 AM  | 12:00 PM | 3   | 1:15 PM | 5:15 PM | 4   | 7           |
| Tuesday   | 8:00 AM  | 12:00 PM | 4   | 1:00 PM | 4:00 PM | 3   | 7           |
| Wednesday | 7:00 AM  | 2:30 PM  | 7.5 | 3:00 PM | 6:30 PM | 3.5 | 11          |
| Thursday  | 7:00 AM  | 1:30 PM  | 6.5 | 2:30 PM | 5:00 PM | 2.5 | 9           |
| Friday    | 8:10 AM  | 2:40 PM  | 6.5 | 2:50 PM | 6:50 PM | 4   | 10.5        |
| Saturday  | 8:00 AM  | 10:00 AM | 2   | 1:00 PM | 5:00 PM | 4   | 6           |
| Sunday    | 10:05 AM | 11:35 AM | 1.5 | 3:05 PM | 6:05 PM | 3   | 4.5         |
|           |          |          |     |         |         |     | 55          |

|               | HOURS | SALARY PER HOUR | TOTAL SALARY |
|---------------|-------|-----------------|--------------|
| Regular Hours | 40    | \$25.00         | 1000         |
| Overtime      | 15    | 37.50           | 562.50       |
|               |       | <b>TOTAL</b>    | 1562.50      |



Name Kelly Date 5/29/18

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**Bellmore-Merrick  
Central High School District**

**Final Examination  
Discrete Math**

**Day 2**

**June 2017**

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature \_\_\_\_\_

Do not write in this box

|                    |
|--------------------|
| Day 1 Score: _____ |
| Day 2 Score: _____ |
| Total: _____       |



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Final Examination  
Discrete Math – Day 2 – June 2017

**Part 2: Show ALL work in the answer booklet. Answer 4 of the following 5 questions from this part.** Each correct answer will receive 3 credits. Partial credit will be awarded. [12]

1. A rectangle has an area measuring 24 square centimeters. Its length and width are whole numbers of centimeters. What are the possible combinations of length and width? Create a list to show all possibilities.

| length | width | Area | Perimeter           |
|--------|-------|------|---------------------|
| 1      | 24    | 24   | $2(1) + 2(24) = 50$ |
| 2      | 12    | 24   | $2(2) + 2(12) = 28$ |
| 3      | 8     | 24   | $2(3) + 2(8) = 22$  |
| 4      | 6     | 24   | $2(4) + 2(6) = 20$  |

2. Allen makes 3.95% commission on all sales over \$5,000. Allen earns a salary of \$2,000 for the week. He sells \$22,378 worth of merchandise. How much does he make for the week?

$$\begin{array}{r}
 - 5000 \\
 \hline
 17378 \times 0.0395 = 686.43 \\
 + 2000 \\
 \hline
 \boxed{\$ 2686.43}
 \end{array}$$

Mary's five friends began an exercise group. They decided to walk along a trail each day. On the first day, they walked  $\frac{2}{3}$  of the trail. On the second day, they walked  $\frac{3}{5}$  of the trail. On the third day, they walked  $\frac{4}{7}$  and on the fourth day  $\frac{5}{9}$  of the trail. If this pattern continues, what fraction of the trail will Mary and her friends walk on the tenth day?

| day   | 1             | 2             | 3             | <del>4</del>  | 5              | 6              | 7              | 8              | 9               | 10              |
|-------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| trail | $\frac{2}{3}$ | $\frac{3}{5}$ | $\frac{4}{7}$ | $\frac{5}{9}$ | $\frac{6}{11}$ | $\frac{7}{13}$ | $\frac{8}{15}$ | $\frac{9}{17}$ | $\frac{10}{19}$ | $\frac{11}{21}$ |

$$\boxed{\frac{11}{21} \text{ of the trail}}$$



4. Using the advertisement below, determine the amount of money a person would spend if they wanted to rent the apartment for two years: **24 months**

**Massapequa:** Rent for \$2,000 per month. 4 BR, 2 BA Cape with lg. LR has cathedral ceiling & FP. Kit. with huge dining area. Full finished basement with woodstove, oversized 2/c gar, 100' x 100' lot with large deck.

$$2000 \times 24 = \boxed{48,000}$$

5. Jenna wants to purchase fresh baked cookies. A 6 pound box costs \$18.27 and an 8.5 pound box costs \$26.01.

- a. What is the unit price per pound for each box?

$$\frac{18.27}{6} = 3.05 \quad \frac{26.01}{8.5} = 3.06$$

- b. Which box is a better buy and why?

The 6 lb box b/c it is cheaper per ounce

**Part 3: Show ALL work in the answer booklet. Answer 3 of the following 4 questions from this part.** Use the space and the graphs provided to show work and sketches. Each correct answer will receive 6 credits. Partial credit will be awarded. [18]

Find  $A+B$

$$A = \begin{bmatrix} 3 & 5 & -7 \\ 1 & 0 & 4 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 8 & 6 \\ 5 & -9 & 10 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 13 & -1 \\ 6 & -9 & 14 \end{bmatrix}$$

7. Hope goes to the Apple Store to buy the new iPhone for \$399. She is also required to pay an activation fee of \$86. She has a 12% off coupon and the sales tax is 6.725%. How much is her total?

$$399 + 86 = \$485 \times .12$$

$$485 - 58.20 = 426.80 \times .06725$$

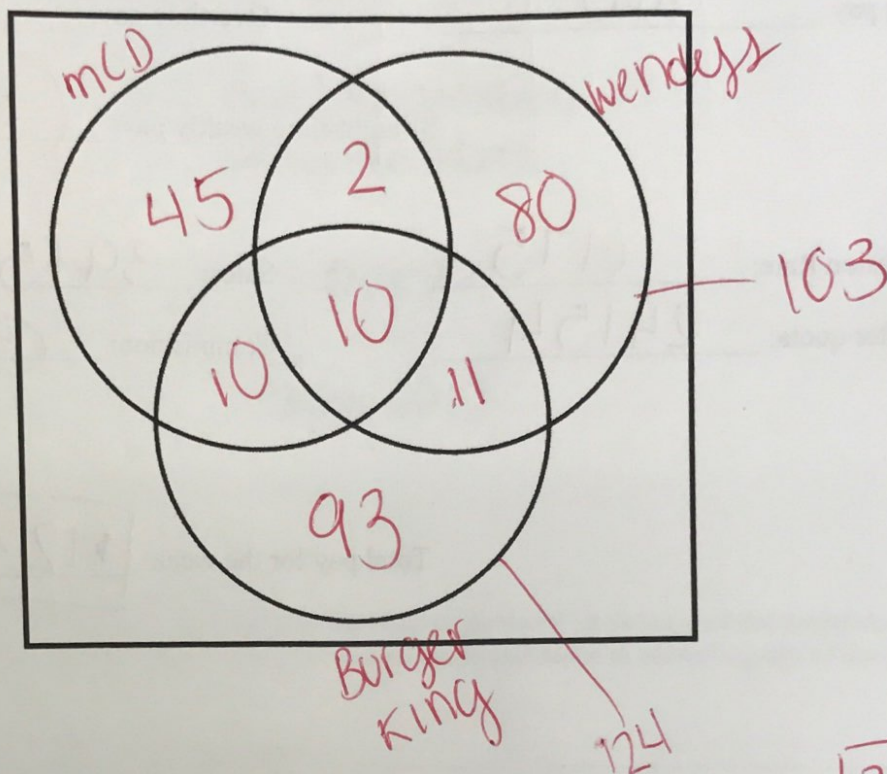
$$+ 28.70$$

$$\boxed{\$455.50}$$



8. How many people were surveyed if:

- 45 only like McDonald's
- 103 like Wendy's
- 124 like Burger King
- 12 like McDonald's and Wendy's
- 20 like McDonald's and Burger King
- 21 like Wendy's and Burger King
- 10 like all 3



How many people were surveyed?

251

9. Dennis makes \$19.00 an hour and his employer pays him time and a half for the hours worked over 40 for the week. He also receives 1.75% commission on all sales over \$15,000.

Dennis works 9 hours on Monday, 8 hours on Tuesday, 7 hours on Wednesday, and 9 hours on Thursday and Friday. He sells \$39,154 worth of merchandise. How much does he make for the week?

Total hours worked: 42

Regular hours: 19.00

Hourly rate: 40

Regular pay: 760

Overtime hours: 28.50

Overtime rate: 2

Overtime pay: 57

Straight-time weekly pay: 817

Commission Rate: .0175

Sales: 39154

Sales after quota: 24154

Commission: 422.70

Total pay for the week: \$1239.70