Full Name:

Date: ____ ____ ____ ____ 20 ____ ____ (month/day/year)

Teacher Name:

Amount of Time to Complete (to be filled in by your teacher): ____ ____ mins.

Instructions

The test is comprised of 21 questions.

Please fill in the bubble for your chosen answer, A, B, etc. on the answer sheet or write clearly in the space provided in the test booklet where indicated.

Be sure to use blue or black ball-point pens or a pencil (no felt tips or gel pens) and if you fill in an incorrect bubble, simply cross it out and fill in the correct bubble.

For each question there is a confidence scale from 1 to 7. Please fill in the bubble on the answer sheet that relates to the number to indicate how confident you were in answering each question.

You are not allowed a calculator and you have 45 minutes to complete the test.

Please try your best. This test is designed by the University of Massachusetts Dartmouth to help us assess your mathematical knowledge.

Thank you.

Place ID label below:

Please do not write below this line.

2001
Item #1a

Which linear function best describes the graph shown below?

A. \[ y = -3x + \frac{1}{2} \]
B. \[ y = \frac{1}{2}x + 3 \]
C. \[ y = -3x - \frac{1}{2} \]
D. \[ y = \frac{1}{2}x - 3 \]

Item #1b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7
Not confident  Neutral  Very confident
Item #2a

Vicki works as a salesclerk in a clothing store. She earns $10 per hour plus a commission of 6% of her total sales. Which equation represents $e$, her total earnings when she works $h$ hours and sells a total of $d$ dollars in merchandise?

A. $e = 10h + 0.06d$

B. $e = 10h + 0.6d$

C. $e = 6h + 10d$

D. $e = 0.06h + 10d$

Item #2b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #3a

The number of bacteria in a culture doubles each hour. Which graph below best represents this situation?

A.  

B.  

C.  

D.  

Item #3b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7

Not confident  Neutral  Very confident
Larissa plans to select one of the two mobile phone services described in the chart below. Each of the two companies charge a fixed monthly fee plus an additional charge for each minute in excess of the free time allowance.

<table>
<thead>
<tr>
<th>Mobile Phone Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company</strong></td>
</tr>
<tr>
<td>Cellco</td>
</tr>
<tr>
<td>Firstfone</td>
</tr>
</tbody>
</table>

Larissa plans to use her mobile phone as her only phone and predicts that she will use it between 600 and 900 minutes per month. To find $t$, the total monthly charge for each company based on $m$ minutes of phone use, Larissa wrote the two equations shown below.

**Cellco:** $t = 35 + (m - 300)(0.08)$ for $m \geq 300$

**Firstfone:** $t = 22 + (m - 400)(0.15)$ for $m \geq 400$

Which is the least expensive plan for 600 minutes of phone use per month? Show or explain how you obtained your answer.

Which is the less expensive plan for 900 minutes of phone use per month? Show or explain how you obtained your answer.
Determine the number of minutes for which the monthly charges for the two companies would be exactly the same amount. Show or explain how you obtained your answer.

How can Larissa use the results for parts a, b, and c to make her selection of a cell phone company? Explain your reasoning.

**Item #4b**

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7

Not confident  Neutral  Very confident
Item #5a

If, $3x + y = 6$, what is the value of $6x + 2y$?

A. 6

B. 8

C. 12

D. 16

Item #5b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7

Not confident  Neutral  Very confident
Item #6a

What is the 9th term in the quadratic sequence shown below?

2, 5, 10, 17, 26, ...

A. 97
B. 82
C. 71
D. 65

Item #6b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #7a

If the position of a particle on the x-axis at time $t$ is $-5t^2$, then the average velocity of the particle for $0 \leq t \leq 3$ is:

A. -45

B. -30

C. -15

D. -10

Item #7b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #8a

Below, please show all work or explain how you reached your answer.

Solve for $x$: $2(x - 3) = 1.2 - x$

Item #8b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #9a

Which of the following is an equation for a line that is not parallel to the line for this equation?

\[-x + 4y - 8 = 0\]

A. \( y = \frac{1}{4} x - 1 \)

B. \( y = \frac{1}{4} x + 21 \)

C. \( -2x + 4y - 8 = 0 \)

D. \( -x + 4y + 8 = 0 \)

Item #9b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #10a

The formula for the area, $A$, of a square is:

$$A = s^2,$$

where $s$ is the length of the side of the square.

Which graph shows the relationship between the length of one side of a square and its area?

A. 

B. 

C. 

D. 

Item #10b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7

Not confident  Neutral  Very confident
Item #11a

A rectangle has a perimeter of 44 inches and an area of 72 square inches. What are the lengths of the sides of the rectangle?

Area of a rectangle: \( A = b \cdot h \)

A. 2 inches and 36 inches
B. 4 inches and 18 inches
C. 8 inches and 9 inches
D. 11 inches and 11 inches

Item #11b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #12a

Marcos had 15 coins in nickels and quarters. He had 3 more quarters than nickels. He wrote a system of equations to represent this situation, letting \( x \) represent the number of nickels and \( y \) represent the number of quarters. Then he solves the system by graphing. What is the solution?

A. (6, 9)

B. (5, 10)

C. (9, 6)

D. (10, 5)

Item #12b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7
Not confident Neutral Very confident
Item #13a

The graph below models the cost of manufacturing calculators.

![Graph showing calculator manufacturing costs](image)

Which equation shows the relationship between the number of calculators, \( n \), and the total cost, \( C \)?

A. \( C = 300 + n \)

B. \( C = 300 + 0.08n \)

C. \( C = 300 + 12.5n \)

D. \( C = 300 + 15n \)

Item #13b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
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</table>
Item #14a

Which of the following equations represents a line that is parallel to the line $4x - 2y = 8$ and passes through the point $(0, -8)$?

A. $2x + y = -4$

B. $2x - y = 8$

C. $x - 2y = 8$

D. $x - 2y = 16$

Item #14b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7
Not confident Neutral Very confident
Item #15a

If the graphs of \( y = 5x + 40 \) and \( y = 10x + 20 \) are drawn on the same axes, they will

A. not intersect.

B. intersect at (5, 10).

C. intersect at (4, 60).

D. intersect at (12, 100).

Item #15b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7

Not confident  Neutral  Very confident
Item #16a

Kathy rode her bicycle from her house to the top of a nearby hill. First, she traveled very fast on a level road. Then, she traveled more and more slowly as she went up the hill. Which graph best shows the distance she traveled over time?

A. [Graph A]

B. [Graph B]

C. [Graph C]

D. [Graph D]

Item #16b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1  2  3  4  5  6  7
Not confident  Neutral  Very confident
Item #17a

Below, please show your work or explain how you reached your answer.

Write a rule that could be used to show the relationship between $x$ and $y$ in the table below.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>16</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
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</tbody>
</table>

Item #17b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

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</tbody>
</table>
Item #18a

Which graph best represents a solution to this system of equations?

\[
2x - 3y = 0 \\
x + 2y = -7
\]

A. ![Graph A]  
B. ![Graph B]  
C. ![Graph C]  
D. ![Graph D]  

Item #18b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7  
Not confident Neutral Very confident
Item #19a

The length of a rectangle is equal to triple the width. Which system of equations can be used to find the dimensions of the rectangle if the perimeter is 85 centimeters?

A. \[ l = w + 3 \]
\[ 2(l + w) = 85 \]

B. \[ l = 3w \]
\[ 2l + 6w = 85 \]

C. \[ l = 3w \]
\[ 2(l + w) = 85 \]

D. \[ l = w + 3 \]
\[ 2l + 6w = 85 \]

Item #19b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1 2 3 4 5 6 7

Not confident Neutral Very confident
Item #20a

The graph of the function \( y = x^2 \) is given below.

How will the graph be affected if the coefficient of \( x^2 \) is decreased to \( \frac{1}{4} \)?

A. The parabola will be wider.
B. The parabola will be narrower.
C. The parabola will be translated up.
D. The parabola will be translated down.

Item #20b

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

1. Not confident
2. Neutral
3. Very confident
**Item #21a**

What is the $y$-intercept of the function $f(x) = 3(x - 2)$?

A. 3  
B. 1  
C. -2  
D. -6  

**Item #21b**

Below, please circle the number that corresponds to how confident you are in answering this question correctly.

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<table>
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