FEEDBACK TUTORIAL LETTER

1ST SEMESTER 2021

Assignment 1

Basic Mathematics
BMS411S
ASSIGNMENT 1

Question 1 [24 marks]

1.1. At a display booth at an amusement park, every visitor gets a gift bag. Some of the bags have items in them as shown in the table below.

<table>
<thead>
<tr>
<th>Items</th>
<th>Bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hat</td>
<td>Every 2\textsuperscript{nd} visitor</td>
</tr>
<tr>
<td>T-shirt</td>
<td>Every 7\textsuperscript{th} visitor</td>
</tr>
<tr>
<td>Backpack</td>
<td>Every 10\textsuperscript{th} visitor</td>
</tr>
</tbody>
</table>

How often will a bag contain all three items? [3]

\begin{align*}
2 & - 2, 4, 6, 8, 10... 70 \\
7 & - 7, 14, 21, 28, 35, 42, 49, 56, 63, 70 & (\text{award two marks for all correct factors}) \\
10 & - 10, 20, 30, 40, 50, 60, 70 \\
\text{LCM} & = 70 \\
\end{align*}

1.2. Pencils come in packages of 10. Erasers come in packages of 12. Phillip wants to purchase the smallest number of pencils and erasers so that he will have exactly 1 eraser per pencil. How many packages of pencils and erasers should Phillip buy? [5]

\begin{align*}
10 & - 10, 20, 30, 40, 50, 60 \\
12 & - 12, 24, 36, 48, 60 & \checkmark \\
\text{LCM} & = 60 \\
60 & \div 10 = 6 \text{ packages of pencils} \checkmark \\
60 & \div 12 = 5 \text{ packages of erasers} \checkmark \\
\end{align*}
1.3  Kiara baked 30 oatmeal cookies and 48 chocolate chip cookies to package in plastic containers for her friends at school. She wants to divide the cookies into identical containers so that each container has the same number of each kind of cookie. If she wants each container to have the greatest number of cookies possible, how many plastic containers does she need?  

\[ 30 - 1, 2, 3, 5, 6, 10, 15, 30 \]  
\[ 48 - 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 \]  
\[ \text{GCF} = 6 \]  
Kiara needs 6 plastic containers for her cookies.

1.2.  Simplify each of the following and leave answer in standard form to 3 decimal places.

1.2.1.  \((3.05 \times 10^{-7})(8.67 \times 10^4)\)  
\[ (3.05 \times 8.67) \times 10^{-7+4} \]  
\[ 26.44 \times 10^{-3} \]  
\[ 2.64 \times 10^{-2} \]

1.2.2.  \(\frac{6.23 \times 10^{-5}}{8.056 \times 10^{-8}}\)  
\[ 0.7733 \times 10^3 \]  
\[ 7.733 \times 10^2 \]

1.3.  Simplify the following expressions:

1.3.1.  \(\frac{12}{6} \div \frac{8}{3} - \frac{1}{4} + \frac{20}{50} \div \frac{20}{50}\)  
\[ = 2 \times \frac{3}{8} - \frac{1}{4} + \frac{5}{2} \]  
\[ = \frac{3}{4} - \frac{1}{4} + 1 \]  
\[ = \frac{2}{4} + 1 \]  
\[ = \frac{3}{2} \]

1.3.2.  \(\left(\frac{2}{3} \times \frac{1}{9} - \frac{4}{5}\right) - \left(\frac{7}{2} + \frac{1}{2}\right)\)
\[ \sqrt{64z^{12}w^{18}} = 2z^2w^3 \]

**Question 2 [26 marks]**

2.1 Simplify the following expression. (Clearly show all your work)

2.1.1 \[ \frac{6}{2z^2w^3} \]

\[ = \frac{6}{\sqrt{2}z^2w^{18}} \]

\[ = \frac{(2z^{12}w^{18})^{\frac{1}{2}}}{2z^2w^3} \]

\[ = \frac{2z^2w^3}{2z^2w^3} \]

\[ = 1 \]

2.1.2 \[ \frac{4(a+b)^2 - 4(a-b)^2}{16a} \]

\[ = \frac{4(a+b)(a+b) - 4(a-b)(a-b)}{16a} \]

\[ = \frac{4a^2 + 2ab + b^2 - 4a^2 + 2ab - b^2}{16a} \]

\[ = \frac{4ab + 4b^2 - 4a^2 + 8ab - 4b^2}{16a} \]

\[ = \frac{16ab}{16a} = b \]

2.1.3 \[ 4x^3y^2 \quad \text{if } y = -4 \text{ and } x = -2 \]

\[ = 4x^3y^2 \]
= 4(-2)^3 (-4)^2 \checkmark
= -512 \checkmark

2.2 In each of the following equations, solve for the unknown variable

2.2.1 \[ \frac{1}{x-2} - 1 = \frac{7}{x-2} \]
\[ 1 - 1(x - 2) = 7 \checkmark \]
\[ 1 - x + 2 = 7 \checkmark \]
\[ -x = 7 - 3 \checkmark \]
\[ x = -4 \checkmark \]

2.2.2 \[ \frac{3}{y^2} = \frac{y-4}{3y^2} \]
\[ 3y^2 \times \frac{3}{y^2} = \frac{y-4}{3y^2} \times 3y^2 \checkmark \]
\[ 9 = y - 4 \checkmark \]
\[ y = 13 \checkmark \]

2.3. You have a sum of money. Two hundred dollars has just been added to it. What you now have is four hundred dollars more than half of what you originally had. How much did you originally have?

Let \( x \) be the sum of money I originally have
\[ x + 200 \checkmark = \frac{1}{2}x + 400 \checkmark \]
\[ \frac{1}{2}x = 200 \]
\[ x = 400 \checkmark \]
I originally had $400 \checkmark

2.4 The sum of four consecutive numbers is 20 more than the sum of the second and the fourth numbers. Find the consecutive numbers? \[ Answer: 9,10,11,12 \]
\[ x + (x + 1) + (x + 2) + (x + 3) = (x + 1) + (x + 3) + 20 \]
\[ 4x + 6 = 2x + 24 \]
\[ 2x = 18 \]
\[ x = 9 \]

**Question 3 [12 marks]**

3.1 Factorize and simplify completely each of the following expressions.

3.1.1 \[ 2x^2y - 14xy^2 + 4xy \]
\[ 2xy(x - 7y + 2) \]

3.1.3 \[ \frac{2x-x^2}{2-x} \times \frac{2-x}{-x} \]
\[ = \frac{2x-x^2}{2-x} \times \frac{2-x}{-x} \]
\[ = \frac{2x-x^2}{2-x} \times \frac{2-x}{-x} \]
\[ = \frac{x(2-x)}{-x} \]
\[ = -(2 - x) \]

3.1.4 \[ \frac{wx-by-wy+bx}{(w+b)(x-y)} \]
\[ = \frac{w(x-y) + b(x-y)}{(w+b)(x-y)} \]
\[ = \frac{(w+b)(x-y)}{(w+b)(x-y)} \]
\[ = 1 \]
<table>
<thead>
<tr>
<th>QUESTION</th>
<th>MARKS</th>
</tr>
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<tbody>
<tr>
<td>QUESTION 1</td>
<td>24</td>
</tr>
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<td>26</td>
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<td>QUESTION 3</td>
<td>12</td>
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TOTAL MARKS: 62

******************************************************************************END OF ASSIGNMENT 1******************************************************************************