FEEDBACK TUTORIAL LETTER

2nd SEMESTER 2020

ASSIGNMENT 1

INTRODUCTION TO MATHEMATICS

ITM111S
Course Name: INTRODUCTION TO MATHEMATICS – BUSINESS AND MANAGEMENT
Course Code: ITM111D
Department: MATHEMATICS AND STATISTICS
Course Duration: ONE SEMESTER

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ASSIGNMENT 1 FEEDBACK TUTORIAL LETTER

Congratulations for completing and submitting your ITM111D assignment 1 despite the challenges that came with Covid-19.

We have made comments in your answer scripts. Please take those comments seriously so that you can do better in your other assessments.

Your marker-tutors for ITM111D wish you the very best.
Assignment 1

Question 1 (17 marks)

1.1 If \( V = \pi \left( 3R^2 + h^2 \right) \), determine the value of \( V \) when \( h = 2 \), \( R = -6 \) and \( \pi = \frac{22}{7} \). Leave the final answer correct to 2 significant figures.

\[ V = \frac{22}{7} \left[ 3(-6)^2 + 2^2 \right] \checkmark \]

\[ = \frac{22}{7} (108 + 4) \checkmark \]

\[ = 352 \checkmark \]

*Answer is 350 to 2 significant figures*

1.2 Without the use of a calculator, evaluate \( \log_3 32 - \log_3 4^4 + \log_3 \sqrt[3]{625} \).

\[ \log_3 32 - \log_3 4^4 + \log_3 \sqrt[3]{625} = \frac{\log_3 32}{\log_3 8} - \log_3 2^4 + \log_3 5^2 \checkmark \]

\[ = \frac{5 \log_3 2}{3 \log_3 2} - 10 + 2 \checkmark \]

\[ = \frac{5}{3} - 10 + 2 \checkmark \]

\[ = \frac{19}{3} \checkmark \]

1.3 Expand and simplify the expression \( (x^2 + y)(y - x) \).

\( (x^2 + y)(y - x) = x^3 y - x^3 + y^2 - xy \)
1.4 Factorize the expression \(2ax - 3bx - 6by + 4ay\) completely.
\[
2ax - 3bx - 6by + 4ay = x(2a - 3b) + 2(2a - 3b)
= (2a - 3b)(x + 2)
\]

Question 2 (10 marks)

Fruit & Veg shop in Windhoek sells water in 5-litre bottles.

2.1 On Wednesday Fruit & Veg shop received \(N\$2,530\) from selling 5-litre bottles of water at \(N\$11.50\) per bottle. How many litres of water were sold on that day?

\[
\frac{2530}{11.5} = 220 \quad 5 - \text{litre bottles}
= 1100 \text{litres}
\]

2.2 On Thursday, the shop received \(N\$x\) by selling 5-litre bottles of water at \(N\$11.50\) each. In terms of \(x\), how many litres of water were sold on that day?

Number of 5-litre bottles is \(\frac{x}{11.5}\)

Number of litres is \(\frac{5x}{11.5}\)

2.3 On Friday the shop received \(N\$(x - 20)\) by selling 5-litre bottles of water at \(N\$9\) each. In terms of \(x\), how many litres of water were sold on that day?

(2)
Number of 5-litre bottles is \( \frac{x - 20}{9} \).

Number of litres is \( \frac{5(x - 20)}{9} \).

2.4 If the number of bottles sold on Thursday equal to the number of bottles sold on Friday, how many bottles of water were sold in each of these two days? (4)

\[
\frac{x}{11.5} = \frac{x - 20}{9} \quad \checkmark
\]

\[
9x = 11.5x - 230 \quad \checkmark
\]

\[
-2.5x = -230
\]

\[
x = 92 \quad \checkmark
\]

Number of bottles is \( \frac{92}{11.5} = 8 \) \( \checkmark \)

Question 3 (16 marks)

3.1 A bus was travelling with 48 passengers. When the bus arrived at the first stop, it dropped off some passengers and picked 4 more people. At the next stop, the bus dropped half of the passengers. There were now 14 passengers on the bus. Formulate a linear equation from the statement and calculate the number of passengers who were dropped off by the bus at the first stop. (6)
At first stop, number of people in the bus is $48 - x + 4$. ✓

At the next stop, number of people in the bus is $\frac{1}{2}(48 - x + 4)$ which is 14.

∴ $48 - x + 4 = 14$ ✓

$x = 24$ ✓

The bus dropped 24 passengers in the first stop. ✓

3.2 The area of every rectangle is the product of it's width and it's length. A particular rectangular soccer field has an area of 11200 square metres. Its length is 20 metres short of twice its width. Use the quadratics formula to calculate the width and length of this soccer field. You will score a zero if your quadratic formula is not shown or if incorrectly written or if used incorrectly.
Let \( l \) represent length, \( w \) represent width and \( A \) represent area.

\[
l = 2w - 20. \quad \checkmark
\]

\[
\therefore w(2w - 20) = 11200 \quad \checkmark
\]

\[
2w^2 - 20w - 11200 = 0 \quad \checkmark
\]

\[
w = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \text{Formula must be correctly written}
\]

\[
= \frac{-(-20) \pm \sqrt{(-20)^2 - 4(2)(-11200)}}{2(2)} \quad \checkmark
\]

\[
= \frac{20 \pm \sqrt{90000}}{4} \quad \checkmark
\]

\[
= \frac{20 \pm 300}{4} \quad \checkmark
\]

\[
w = 80 \text{ or } w = -70. \text{ But width cannot be negative.} \quad \checkmark
\]

Thus width = 80 metres and length is 140 metres. \( \checkmark \)

Question 4 (7 marks)

4 Solve the following inequality and represent your solution on a number line:

\[
\frac{2x + 4}{7} < 3x + 5 \leq \frac{1}{2}(x + 12) \quad (7)
\]
\[
\frac{2x + 4}{7} < 3x + 5 \\
2x + 4 < 21x + 35 \checkmark \\
-19x < 31 \checkmark \\
x > \frac{31}{19} \checkmark \\
\frac{-31}{19} < x \leq \frac{2}{5} \\
\]

End of Assignment 1.

Total marks: 50