SIT190 - PAGE - WEEK 5 - ONTRACK ASSESSMENT

TRIMESTER 1, 2024

Task 1: Give-it-a-go and Give-it-a-go-again

The purpose of the Give-it-a-go and Give-it-a-go-again quizzes is to help you identify what you have understood and to identify any areas that you need further help in. This task is about reflecting on those attempts and acting on them to achieve your learning goals.

You must attempt all questions and achieve at least 60% in the Give-it-a-go-again quiz.
Usually we would expect an improvement in the Give-it-a-go-again quiz compared to the Give-it-a-go quiz.

(1) Attempt the Give-it-a-go quiz early in the week. Take a screenshot of the results.
(2) Review your quiz results.
   (a) If you did not achieve full marks, identify a question that you need answered in order to understand the material.
   (b) Identify and implement a strategy to address this question. For example, you might submit a question to the weekly discussion forum, visit the HelpHub or Maths Mentors, ask the unit chair, or do further reading.
   (c) Describe the question you identified and your strategy for addressing it (2-4 sentences).
(3) Attempt the Give-it-a-go-again quiz later in the week. Take a screenshot of the results.
   Note: your screenshot should include the summary of results including the session ID. Remember, you must achieve at least 60% in this quiz.
(4) Submit a short reflection (approximately 80 words) on your improvement between the Give-it-a-go and Give-it-a-go again quizzes. Explain how your strategy helped. If it was not useful, explain why and suggest what you might do next time.

Please note that in this task, you will not be penalised for not achieving full marks in either the Give-it-a-go or the Give-it-a-go-again quizzes.

Task 2: Index RULES

(1) Simplify the following expressiony applying the index rules. Only apply one rule at each step and identify the rule you applied.

   (a) $12^2 4^3 - 4^2 4$

   (b) $\frac{x^6 x^3}{x^2} + (4x^3)^2$

   (b) $\frac{2x^{10} - 3x^2}{x^2}$

(2) Solve the following expression for x: $13x^2 = 39$.

Task 3: Log Rules

(1) Simplify the following expressions by applying the log rules. At each step identify the rule you applied.

   (a) $\log_8(4) + \log_8(2)$

   (b) $2\log_2(12) - \log_2(4)$

(2) Use a change of base, then simplify to express $\log_{15}(60)$ as a fraction. (You must select a base which means you do not have to use a calculator to get the solution.)

(3) Solve the following expressions for x:

   (a) $\ln(x + 3) = 7$

   (b) $e^{4x-7} = 8$

Task 4: Cultural Contribution

A paper on the Mathematics of Ancient Egypt by J. Dubbey is available at `https://www.jstor.org/stable/30211437`. There are further references in the unit site - see 'Interesting snippets' under the weekly content.

An example of the Egyptian method of solving $x + \frac{x}{3} = 14$ using 'heap-calculation' is given in Dubbey's paper. The method is given in Table 1.

(1) Describe an application in Ancient Egypt that would require mathematics.
(2) Explain why mathematics was needed in this application.
(3) Solve the equation $x + \frac{3x}{24} = 11$ using the Egyptian method of 'heap-calculation' and a guess of $x = 8$.
   (An example of this method is described in Table 1.)
(4) Solve $x + \frac{x}{3} = 16$ using our current algebraic methods. Compare the two methods.
(5) Which method did you prefer and why?

TABLE 1. Heap-calculation: $x + \frac{x}{7} = 19$

Steps	Example
A guess is made.	Guess is $x = 7$
The left hand side (LHS) is evaluated with the guess value.	LHS$=x + \frac{x}{7} = 7 + \frac{7}{7}$ $= 7 + 1 = 8$
If the LHS does not equal the right hand side (RHS), we divide the RHS by the LHS	As LHS$=8$ and RHS$=19$, we get $\frac{19}{8}$
We now multiply our guess by this number to obtain the correct value for x	$x = 7 \times \frac{19}{8} = \frac{133}{8}$
Checking: when $x = \frac{133}{8}$, we have $x + \frac{x}{7} = \frac{133}{8} + \frac{133}{8} \times \frac{1}{7} = \frac{1064}{56} = 19$	

SUBMISSION

To successfully complete this assessment, you must submit:

Task 1: Quizzes, Question, Strategy and Reflection

1.1 Screenshot of results of Give-it-a-go quiz.

1.2 Screenshot of results of Give-it-a-go-again quiz (You must achieve at least 60% in this quiz).

1.3 Describe the question you identified and your strategy for addressing it (2-4 sentences).

1.4 Submit a short reflection (approximately 80 words) on your improvement between the Give-it-a-go and Give-it-a-go again quizzes.

Task 2: Indices and Exponentials

2.1 The simplified expressions for Q2.1(a-c) including all working and the rules used.

2.2 The solutions for Q2.2 showing all working.

Task 3: Logs

3.1 The simplified expressions for Q3.1(a-b) including all working and the rules used.

3.2 The simplification to a fraction for the expression in Q3.2 and showing all working for the change of base and for the simplification. You must use a base that means that you do not have to use a calculator to find the answer.

3.3 For each expression in Q3.3 the value(s) of x including all working.

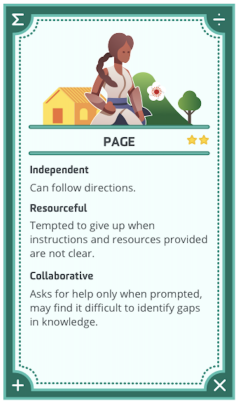
Task 4: Cultural Contribution

- A description of an application in Ancient Egypt that required mathematics and how it would have been used.

- The heap calculation for Q4.3 including all working.
- The algebraic solution for Q4.4 including all working.
- A comparison of the two methods for solving Q4.3/4.
- 1-2 sentences explaining why you prefer one method.

Useful resources

- Watch, Read and Think Section 5
  - Section 5.2 gives the index rules (Rules 1-7) and an example of how to remove negative powers.
  - Section 5.3 gives the log rules, including an example of change of base for $\log_8(16)$ which you may find helpful.
  - Section 5.5 solves problems involving ln and e.
- Treasure Chests ('Rules for exponentials' and 'Logarithms')
- Check out 'Interesting Snippets' at the end of each week in the Learning Resources. There are lots of electronic links to books and articles.



Further Thoughts

1. Further Thoughts

New discoveries about mathematics and how to apply mathematics to solve problems are still being made. Mathematics has been used to solve problems in bioinformatics, business and finance, education, engineering, health, information technology, science, and sport. Consider how maths can empower you to achieve your own career goals. AMSI gives an overview of some of the careers that have advertisements that target maths (`https://amsi.org.au/?publications=mathsadds-2019-20`). Even if you do not want to be a mathematician, you may be interested in applying mathematical techniques to solve problems in your own field.

Note: Further thoughts is **not** part of the Pass On-Track task.