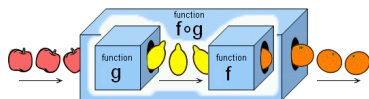


Goals



Source: <https://goo.gl/tz6S4j>

By the end of this unit, students will:

- understand the concepts and techniques in vectors, complex numbers, functions and graph sketching
- apply reasoning skills and solve problems in vectors, complex numbers, functions and graph sketching
- communicate their arguments and strategies when solving problems
- construct proofs of results
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week: Functions and sketching graphs

- determine when the composition of two functions is defined
- find the composition of two functions
- determine if a function is one-to-one
- consider inverses of a one-to-one functions
- examine the reflection property of the graph of a function and the graph of its inverse.

Theoretical Components

Mathspace Lessons:

Composite Functions: <https://goo.gl/67r3wx>

One-to-One functions: <https://goo.gl/uPE6HF>

Additional readings available on Google Classroom WK05 folder.

Watch the following videos:

- Composite Functions: <https://goo.gl/FEoV7C>
- <https://goo.gl/iyQ9df>
- Inverse Functions: <https://goo.gl/nLcmkb>
<https://goo.gl/WIFLM5>

Practical Components

Check Google Classroom WK05 folder:

Ex: Composite Functions Mathspace Questions

Ex: One-to-One Mathspace Questions

Attempt at least 10 questions from each of the listed exercises.

Investigation

See the next page.

20 marks – see rubric.



Investigation

Part A:

Suppose $C(S)$ gives the number of calories burned doing S sit-ups, and $S(t)$ gives the number of sit-ups a person can do in t minutes. Interpret $C(S(2))$.

Part B:

You are expected to use your understanding of derivatives (SMM) and composite functions (SM) to discuss:

$$\frac{d}{dx}(3x + 7)^5 = 15(3x + 7)^4$$

Key words: derivatives, composite functions.

Part C:

Consider the function $f(x) = \frac{x+1}{x-1}$; $x \neq \pm 1$. Find $f \circ f \circ f(x)$ and $f \circ f \circ f \circ f(x)$.

Research about the result and provide a short description.