Week 05
Term 1
2022

HAWKER COLLEGE
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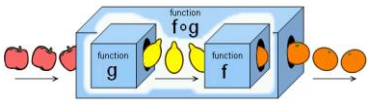
Learning Brief

SM3

Goals



Source: https://goo.gl/tz6S4i

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:

Describing Functions: https://bit.ly/3dKIcX5

One-to-One functions: https://bit.ly/2ZPNfh1

Composite Functions: https://bit.ly/2ZT2sxO

Graphing Composite Functions: https://bit.ly/2MqGYFf

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
Ex: Graphing Comp Functions Mathspace Questions

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

Investigation

See the next page.

20 marks – see rubric.

Q/F/O
Quiz/Forum/Other

Mathspace Quiz: to be completed by 7th March.

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Investigation

Part A:

Let $G(x,y,z) = \begin{bmatrix} x+2yz \\ x^2+y \\ z^2+x \end{bmatrix}$ *and* $F(u,v,w) = u^2 + v + w\boldsymbol{i}$.

Find $F \circ G(1,1,-1)$. State your answer in polar form.

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 $fofof(x)$ and $fofofof(x)$.

Research about the result and provide a short description.