HAWKER COLLEGE
Engage | Inspire | Achieve

Goals

Welcome back 😊

This week we are going to:

- Review indices, including fractional and negative, and index laws
- Use radicals and convert to and from fractional indices
- Understand and use scientific notation and significant numbers

Theoretical Components

Make notes on the following chapters:

Maths Quest 11 Mathematical Methods
- 5A Index Laws
- 5B Negative and rational powers
- 5C Indicial Equations
- 5D Graphs of exponential functions

Cambridge Mathematics Unit 3
- 6A Indices

A reminder on index notation and exponents
https://www.mathsisfun.com/index-notation-powers.html

https://www.mathsisfun.com/exponent.html

Try the quizzes at the bottom of the two pages.

A reminder on significant figures
https://www.youtube.com/watch?app=desktop&v=l2yuDvwYq5g

Practical Components

Do the following questions:
Organise your solutions neatly in your exercise book.

You will require Chapter 5 of Maths Quest 11 Mathematical Methods (pdf – Google Classroom)
- 5A: 1a, 1d, 2a, 2d, 3a, 3d, 4
- 5B: all
- 5C: 6-8, (9-10 will require IT)
- 5D: 1a, 1b, 2c, 2d, 3a, 3h, 4-6

Cambridge Unit 3 textbook
- 6A: 11c, 11e, 14, 16c, 16d, 18a

Investigation

Remember to complete the Practical before you complete and submit the Investigation task. Be sure to check in with your teacher if you are not sure of the concepts being covered and ask for help when you need. These tasks are not assessable, however, completion of the weekly/fortnightly work contributes to your participation and engagement.

Other

Make sure you have joined the Google Classroom. If you have not, see Jacqueline or Jenny.

Fun Fact: Information and cryptographic security is usually measured by how many *bits* of work is required to defeat a given system. Since a state consisting of n bits has 2^n possible values, quantising bits of work is equivalent to measurement on a base-2 exponential scale. This means that one has to be careful when comparing two cryptosystems of different key sizes: for example, RSA-1024 is *not* half as secure as RSA-2048, but is actually 2^{1024} times stronger!

Index laws you need to know:

INDEX LAWS

base → a^m ← index, exponent, power

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^m = a^m b^m$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

$$a^0 = 1$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^{m/n} = \sqrt[n]{a^m}$$

Start getting ready for logarithm laws:

MATHS home

3 Basic Laws of Logarithms

$$\log_a m + \log_a n = \log_a mn$$

$$\log_a m - \log_a n = \log_a \frac{m}{n}$$

$$\log_a m^k = k \log_a m$$

© Maths at Home   www.mathsathome.com

Practical	Student has completed practical work of the brief to an acceptable standard set by the teacher. Self-correction of work evident.	
*Completion of practical work is a **prerequisite** to submitting your investigation.* Your teacher reserves the right not to accept submission of your weekly/fortnightly investigation if the supporting work is incomplete.		

Student Reflection:

Written reflection (optional): What was interesting? What did you find easy? What do you need to work on? Any other comments?

Week 1 Investigation

1. Prove $12^n = 2^{2n} \times 3^n$

2. Prove $3^n + 3^{n+1} = 4 \times 3^n$

3. Show that $\frac{pq^{-1} - p^{-1}q}{p^2 q^{-2} - p^{-2}q^2} = \frac{pq}{p^2 + q^2}$

4. Solve for n: $2^{3n+1} = 64$