# Subject Based Strategies (Sec 4 NA)

What if someone were to say that the questions coming out are already known by the students? First, it would be called as a prank because there is no way that any question for the major exam would get leaked out. Actually, it's not a prank because the type of questions coming out are already on the SEAB website (https://www.seab.gov.sg/docs/default-source/national-examinations/syllabus/nlevel/2019syllabus/4045_y19_sy.pdf) .

Here you will know the questions coming out and all you have to do is to prepare yourself. A strategy to be used is that the syllabus is to be made into a checklist.

e.g.

4045 MATHEMATICS GCE NORMAL (ACADEMIC) LEVEL SYLLABUS (2019)

## SUBJECT CONTENT

Certain parts of the syllabus have been underlined and will only be tested in Section B of Paper 2.

| Topic/Sub-topics | Content | YES | NO | UNSURE |
|---|---|---|---|---|
| **NUMBER AND ALGEBRA** | | | | |
| N1 **Numbers and their operations** | • primes and prime factorisation | | | |
| | • finding highest common factor (HCF) and lowest common multiple (LCM), squares, cubes, square roots and cube roots by prime factorisation | | | |
| | • negative numbers, integers, rational numbers, real numbers and their four operations | | | |
| | • calculations with calculator | | | |
| | • representation and ordering of numbers on the number line | | | |
| | • use of $<, >, \leqslant, \geqslant$ | | | |
| | • approximation and estimation (including rounding off numbers to a required number of decimal places or significant figures and estimating the results of computation) | | | |
| | • use of standard form $A \times 10^n$, where $n$ is an integer, and $1 \leqslant A < 10$ | | | |
| | • positive, negative, zero and fractional indices | | | |
| | • laws of indices | | | |

This will give the student a chance how much work needs to be done in order to gain understanding of that particular topic.

## Before Exams:

- Use Your Moments Wisely

The few minutes before you switch off the light is a fantastic time for memorisation. Learning before sleep significantly improves memory retention - so when you're tucked up in bed, have a quick read through of the most important facts, equations or vocabulary. Then go to sleep.

Research has shown that it may be worse to stop revision and turn straight to the internet or TV because there is evidence that the light of the screen switches off the neurotransmitter that helps us to sleep. Instead, find something non-screen-based that helps you to relax and do that for a while. You will sleep better, and wake better able to face another day's revision.

- Practice Papers/ Ten Year Series

Doing practice papers and questions to test your understanding (your teachers will probably be more than happy to mark these or help you out in any ways possible.

- Mind Maps/Flash Cards

Drawing mind maps or other summary diagrams to test what you can remember, and then checking them against your notes. These will help you to plug any information that you still find difficult to remember.

Those areas that you left out details, go back and review the notes.

- Take regular breaks

It is Impossible to study for more than 2 hours each time. Maximum time for studying is about 90 minutes. It is better if you can split your studying in periods of about 25 to 30 minutes. After 30 minutes of studying, take a break then continue again.

- Prepare your lessons

Before you start your revision, you must know what you need to cover for that study period. After your study session, write down the topics or facts that you have studied so that you may continue with other topics. Prepare your lessons to study for tomorrow so that you do not waste time.

## 3 Major Topics in NA Math.
1. Numbers & Algebra
2. Geometry & Measurements
3. Statistics & Probability.

- Numbers

Always reduce the final answers to 3 significant figures e.g. $4.5853 \approx 4.59$ (3 sig fig)

Map and Area scale, students are expected to know how to convert cm to m or km.
A good way to remember is the stairways
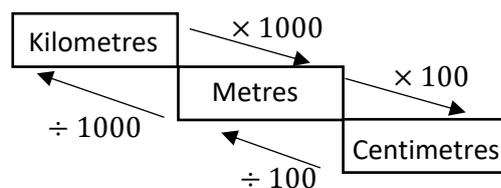


Topic of map scale (distance and area) – to find distance is relatively easy.
To find area you have to square both sides

e.g.     1cm     =     2km     (Map scale)
         $(1cm)^2$ =     $(2km)^2$
         $1cm^2$   =     $4km^2$.

This is fundamental in getting the answers for area scale.
If the question states "find the actual area" or "actual distance" it means to leave the answers in $m^2/km^2$ or m/km respectively.

- Algebra:

In this topic, factorization is an integral component as there are few ways of factorizing. You should be able to factorise:

Linear equations            e.g.     $xy + 2y-4x-8$
                                     $= x(y+2)-4(y+2)$
                                     $= (x-4)(y+2)$

Quadratic expressions       e.g.     Factorise $x^2 - 5x + 6$
                                              $= (x-3)(x-2)$

Quadratic expressions of Special Algebraic Identities:
                    $3^{rd}$ case $– x^2-y^2 = (x-y)(x+y)$;

Students get confused when factorizing these questions

e.g. 4x² - 81y² = (4x-9y)(4x+9y) WRONG
because if we are to reverse it, then well get 16x² - 81y².

Quadratic equations

e.g. x² - 7x + 6 = 0
(x-6)(x-1) = 0
x=6 or 1

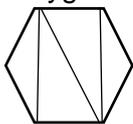Completing the square          x² -x + 7 = (x-2)² + 3
[Pay attention to this because this is needed in sketching the graphs].

Using quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, [remember to insert the values of a,b and c before getting to the answer.

- Geometry & Measurements

  o Polygons

  

  Formula for finding regular polygons $- \frac{(n-2)}{2} \times 180°$ {interior angles} or $\frac{360}{n}$ {exterior angles}
  If somehow during the exams, you forget the formula, a good practice would be to cut the polygon into triangles. (As shown above)

  o Congruent and similarity
  The clue to congruent and similar figures is the arrangement of the vertices. Triangle ABC is congruent to triangle XYZ.
  This means angle A = angle X, angle B = angle Y & angle C = angle Z.
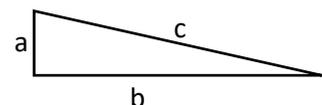
  

  $ABC \equiv XYZ$
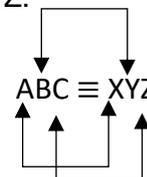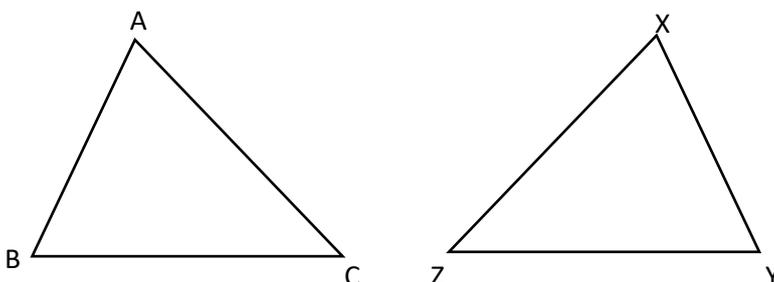
  Test for similar figures
  1) Corresponding angles are equal.
  2) Corresponding sides are proportional.
  3) To prove similar triangles only 2 corresponding angles are needed.
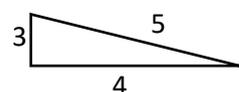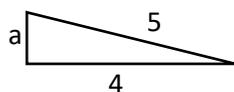
  o Pythagoras' Theorem
  Remember the formula: c² = a²+b²
  The Pythagoras' Theorem can be used to
     1) Determine an unknown side in a right angled triangle.
        a²+4²=5²

     2) Determine whether the triangle is right-angled.
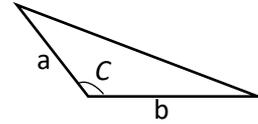        3²+4²=5²
        9+16=25

○ Trigo Ratios
For right-angled triangles, you need to know the following.

t o a , $\tan\theta = \dfrac{opposite}{adjacent}$

c a h , $\cos\theta = \dfrac{adjacent}{hypotenuse}$

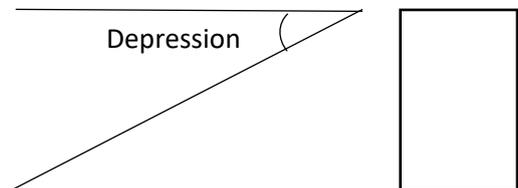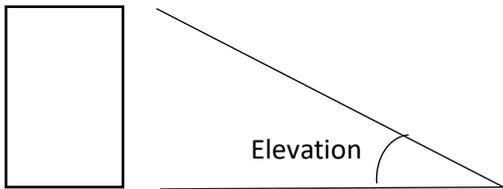s o h. $\sin\theta = \dfrac{opposite}{hypotenuse}$

Formula of area of non right-angled triangle area = $\dfrac{1}{2}ab\sin C$

Sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$, this formula to get 1 unknown side or 1 unknown angle.

Cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$, this is more practical than sine rule.

Angles of elevation & depression: Elevation is from ground to up and depression is from the top to ground.

Depression

Elevation

○ Coordinate geometry:
Gradient: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$.

E.g.   find the gradient of the line from the co-ordinates A (2,4) to the co-ordinates B (7,8)
Gradient: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$m = \frac{8 - 4}{7 - 2}$$
$$m = \frac{4}{5}$$
$$m = 0.8$$

○ Length of line segment = $\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$.

E.g. Find the length of line segment AB
$$\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$
$$= \sqrt{(8 - 7)^2 + (4 - 2)^2}$$
$$= \sqrt{1 + 4}$$
$$= \sqrt{5}$$

Equation of a straight line: y = mx + c.
For this, you take one of the co-ordinates (2,4) into the equation
Y = 0.8x + c. (2,4)
4 = 0.8(2) + c
c = 2.4

y = 0.8x + 2.4