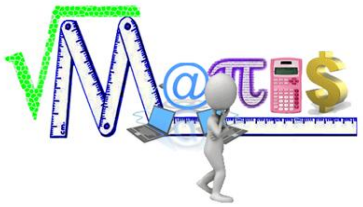


Year 9 (2021)

MATHEMATICS

Georges River College
Peakhurst Campus

Term 2 Stage 5.1/2/3 Exam Notification

Date	**Week 5A** **Thursday, 20th May 2021** **(all classes including 9MATR)** **Week 4B** **Friday, 14th May 2021** **(9MATR only)**
Weighting	25% of Year 9 Mathematics Assessment
Classes Assessed	This assessment is compulsory on **Thursday 20th May** for: 9MATR Mr Smithard Period 5 | 9MATB Ms Pham Period 4 9MATO Ms Azzi Period 5 | 9MATI Mr Bokat Period 4 9MATY Mr Chakari Period 5 | 9MATV Mr Smithard Period 4 9MATG Mr Bokat Period 5 | 9MATP Mr Fomin Period 4 The 5.3 assessment on Friday 14th May, Period 1 is for 9MATR only.
Examination Details	Read the following details carefully and write them into your diary. **Duration**: 45 minutes **Format**: **CALCULATOR** **Venue**: Classrooms
Equipment Required	The following equipment is required for this assessment task: • Blue and/or black pens • Lead Pencils • Approved Calculator • Ruler **Note:** • No borrowing of equipment will be permitted. • A formula sheet (attached) will be provided for this examination. • No handwritten summaries will be permitted.
Marking Criteria	• All questions should be attempted. • All questions are worth 1 mark unless otherwise indicated. • To obtain full marks, answers must be completely correct and all necessary working must be shown. • Some marks may be awarded for partially correct answers. • Trivial attempts will be counted as a non-attempt and may result in an official warning letter being issued.

Absentee Procedures	If you are absent on the day of this examination, upon your return to school you must present a Doctor's Certificate to your Class Teacher or the Head Teacher explaining your absence, otherwise a mark of zero may be awarded. You will be required to sit for your examination on the first day you return to school.

5.1/2 Examination Paper

The following table lists all the Stage 4 and Stage 5 outcomes, knowledge and numeracy skills that will be assessed in this assessment task.

Strands	Assessment Outcomes
Number and Algebra	**Topic: Expressions and Equations** **MA4-8NA** Generalises number properties to operate with algebraic expressions **MA4-10NA** Uses algebraic techniques to solve simple linear equations **MA5.2-6NA** Simplifies algebraic fractions
Working Mathematically 	**MA4-1WM** Communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols **MA4-2WM** Applies appropriate mathematical techniques to solve problems **MA4-3WM** Recognises and explains mathematical relationships using reasoning **MA5.1-3WM** Provides reasoning to support conclusions that are appropriate to the context
Textbook Chapters	• Cambridge 9: NSW Gold – Chapter 3 • Cambridge 9: 5.1 & 5.2 – Chapters 3 • Cambridge 9: 5.1, 5.2 & 5.3 – Chapter 2

Year 9 - 5.1/2 Reference Sheet

Expressions and equations

Expanding brackets

e.g. $2(x + 3) = 2x + 6$

$-3(4 - 2x) = -12 + 6x$

Expressions

e.g. $2x + 3y + 5$

term, constant, coefficient

e.g. 2 more than 3 lots of m is $3m + 2$.

3 less than x is $x - 3$.

Substitution

The process of replacing a pronumeral with a given value.

e.g. If $x = 3$, $2x + 4 = 2 \times (3) + 4$
$= 6 + 4$
$= 10$

e.g. If $x = 2$, $y = -4$,
then $xy = 2 \times (-4)$
$= -8$

Solving word problems

1. Define a pronumeral for the unknown.
2. Set up an equation.
3. Solve the equation.
4. Check the answer and write in words.

Addition/subtraction

Only like terms can be combined under addition or subtraction.
Like terms have the same pronumeral factors; i.e. $4xy$ and $2xy$.

e.g. $5a + 2 + 3a$
$= 5a + 3a + 2$
$= 8a + 2$

e.g. $3x + 2y - x + 4y$
$= 3x - x + 2y + 4y$
$= 2x + 6y$

Solving linear equations

The solution of a linear equation is the value that makes the equation true.

e.g. $2x + 5 = 9$ (-5)
$2x = 4$ ($\div 2$)
$x = 2$

e.g. $5x - 5 = 2x + 7$ ($-2x$)
$3x - 5 = 7$ ($+5$)
$3x = 12$ ($\div 3$)
$x = 4$

Multiplication/division

In simplified form the multiplication sign ($\times$) and division sign ($\div$) are not shown.

That is, $2 \times x = 2x$ and $x \div 2 = \frac{x}{2}$.

Multiplying:
$2a \times 3b = 6ab$

Dividing:
$4x \div 2 = \frac{4x}{2} = 2x$

$\frac{6ab^2}{9b} = \frac{6 \times a \times b \times b}{9 \times b} = \frac{2ab}{3}$

Equations involving fractions

e.g. $\frac{x}{3} + 1 = 5$
$\frac{x}{3} = 4$ (subtract 1)
$x = 12$ (multiply by 3)

e.g. $\frac{x - 2}{4} = 1$
$x - 2 = 4$ (multiply by 4)
$x = 6$ (add 2)

Formulas

Some common formulas are:
$A = \ell b$, $C = 2\pi r$
An unknown value can be found by substituting values for the other pronumerals.

$A = \ell b$
When $\ell = 3$ and $b = 5$:
$A = 3 \times 5$
$A = 15$

5.3 Examination Paper

The following table lists all the additional outcomes that will be assessed in this assessment task.

Strands	Assessment Outcomes
Number and Algebra	**Topic: Financial Mathematics** **MA5.2-4NA** Solves financial problems involving compound interest **Topic: Expressions, Equations & Inequalities** **MA5.2-8NA** Solves linear equations, linear inequalities using analytical techniques **MA5.3-7NA** Solves complex linear and simultaneous equations
Working Mathematically 	**MA5.2-3WM** Constructs arguments to prove and justify results **MA5.3-2WM** Generalises mathematical ideas and techniques to analyse and solve problems efficiently
Textbook Chapters	• Cambridge 9: 5.1, 5.2 & 5.3 – Chapters 1 & 2

Year 9 - 5.3 Reference Sheet

Expressions, equations and inequalities

Substitution

The process of replacing a pronumeral with a given value

e.g. if $x = 3$, $2x + 4 = 2 \times 3 + 4$
$= 6 + 4$
$= 10$

e.g. if $x = 2$, $y = -4$, $xy = 2 \times (-4)$
$= -8$

Expanding brackets

e.g. $2(x + 3) = 2 \times x + 2 \times 3$
$= 2x + 6$
$-3(4 - 2x) = -12 + 6x$

Expressions

e. $x - 3y + 5$

term, coefficient, constant

e.g. 2 more than 3 lots of m is $3m + 2$

Addition/subtraction

Only like terms can be combined under addition or subtraction.

Like terms, e.g. $3a$ and $7a$
$2ab$ and $5ab$
not $4a$ and $7ab$

e.g. $3x + 2y - x + 4y + 7$
$= 3x - x + 2y + 4y + 7$
$= 2x + 6y + 7$

Solving linear equations

Finding the value that makes an equation true

e.g. $2x + 5 = 9$
$2x = 4$ (subtract 5)
$x = 2$ (divide by 2)

e.g. $5(x - 1) = 2x + 7$
$5x - 5 = 2x + 7$ (expand)
$3x - 5 = 7$ (subtract $2x$)
$3x = 12$ (add 5)
$x = 4$ (divide by 3)

Solving word problems

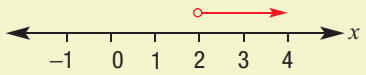
1 Define pronumeral(s).
2 Set up equation(s).
3 Solve equation(s).
4 Check each answer and write in words.

Inequalities

These can be represented using $>, <, \geq, \leq$ rather than $=$.

e.g. $x > 2$

2 not included



Solving inequalities uses the same steps as solving equations except when multiplying or dividing by a negative number. In this case, the inequality sign must be reversed.

e.g. $4 - 2x < 10$ (-4)
$-2x < 6$ $(\div -2)$
$x > -3$ reverse sign

Simultaneous equations

Use substitution or elimination to find the solution that satisfies 2 equations.

Substitution

e.g. $2x + y = 12$ (1)
$y = x + 3$ (2)
In (1) replace y with (2)
$2x + (x + 3) = 12$
$3x + 3 = 12$
$x = 3$
Sub. $x = 3$ to find y
In (2) $y = 3 + 3 = 6$

Elimination

Ensure both equations have a matching pair.
Add 2 equations if matching pair has different sign; subtract if same sign.

e.g. $x + 2y = 2$ (1)
$2x + 3y = 5$ (2)
(1) $\times 2$ $2x + 4y = 4$ (3)
(3) $-$ (2) $y = -1$
In (1) $x + 2(-1) = 2$
$x - 2 = 2$
$\therefore x = 4$

Formulas

Some common formulas
e.g. $A = \pi r^2$, $C = 2\pi r$
An unknown value can be found by substituting values for the other pronumerals.
A formula can be transposed to make a different pronumeral the subject.
e.g. make r the subject in $A = \pi r^2$

$A = \pi r^2$
$\frac{A}{\pi} = r^2$
$\sqrt{\frac{A}{\pi}} = r$
$\therefore r = \sqrt{\frac{A}{\pi}}$ where $r > 0$

Simple quadratic equations

$x^2 = 9$
$x = \pm\sqrt{9}$
$x = \pm 3$

$x^2 = -7$ has no solutions

$16x^2 = 9$
$x^2 = \frac{9}{16}$
$x = \pm\sqrt{\frac{9}{16}}$
$x = \pm\frac{3}{4}$

Computation and financial mathematics

Compound interest

$A = P(1 + R)^n$

\$3000 at 5% for 3 years
Amount = \$3000 $\times$ $(1.05)^3$
= \$3472.88

Simple interest

$I = PRN$ = \$2000 $\times \frac{5}{100} \times 4$
= \$400
Amount = $P + I$

Stage 5 RoSA Mathematics Grading Sheet **Bold – NESA** *Italics – Added locally*

Report Grades	Limited	Basic		Sound		High		Extensive	
RoSA Grades	**E2**	**D3**	**D4**	**C5**	**C6**	**B7**	**B8**	**A9**	**A10**
Financial Mathematics	**Solves simple financial mathematics problems involving earning money.**	**Solves simple financial mathematics problems involving earning and spending money and, given the formula, calculates simple interest.**	*Uses the given compound interest and depreciation formulas to solve simple problems.*	*Solves multi-step financial mathematics problems involving commission and overtime. Uses the compound interest and depreciation formulas to solve word problems (compounded annually only).*	*Solves multi-step problems involving holiday loading, tax tables. Solves for P, r, n in simple interest formula.*	**Applies the compound interest formula to solve financial mathematics problems, including those involving depreciation.**	*Solves financial mathematics problems using compound interest formula for various compounding periods. Compares and contrasts applying simple and/or compound interest over various time periods using numerical expressions.*	*Solves problems for r and t using the compound interest formula.*	*Compares and contrasts applying simple and/or compound interest over various time periods using generalised expressions.*
Equations	*Simplifies expressions using simple substitution. Solves simple one step equations.*	*Solves simple equations involving two steps. Simplifies and substitutes into simple algebraic expressions.*	*Solves simple equations involving three steps, including simple expansions. Plots simple inequalities on a number line.*	*Solves linear equations involving fractions. Solves linear equations with pronumerals on both sides.*	**Solves simple quadratic equations.** *Solves simple inequalities and plots them on a number line.*	*Solves linear inequalities. Uses linear equations to solve problems. Factorises monic quadratic trinomials to solve simple quadratic equations.*	*Solves simple linear simultaneous equations. Factorises a variety of quadratic expressions to solve quadratic equations.*	**Uses analytical methods to solve complex linear, quadratic, simple cubic, and simultaneous equations, including simultaneous equations where one equation is non linear.**	**Uses graphical techniques and a variety of analytical methods to solve problems involving quadratic equations and simultaneous equations. Manipulates algebraic expressions and equations with consideration given to restrictions on the values of variables.**
Algebraic Techniques, Indices and Surds	**Simplifies simple algebraic expressions involving positive integral indices.**	*Collects like terms and expands brackets.*	*Uses the index laws to simplify simple algebraic expressions.*	*Expands and simplifies algebraic expressions. Simplifies simple expressions involving negative indices.*	**Expands and factorises simple algebraic expressions and simplifies algebraic expressions involving fractions and positive, negative and zero indices.**	*Performs operations and simplifies expressions involving surds Simplifies simple expressions involving fractional indices Expands binomial products Factorises monic quadratic trinomials.*	**Applies special products to expand binomial products Factorises a variety of quadratic expressions.**	**Performs operations with surds and indices in numerical and algebraic contexts.**	*Applies complex algebraic techniques to perform all operations with all expressions involving surds, indices and algebra.*