PICTON HIGH SCHOOL
Creating Opportunities Achieving Success

Year 11 Mathematics Standard
Sighted Test

Due Date: Wednesday 3rd April 2024, Period 3	Assessment Name: Sighted Test
Mark: 50 marks	Weighting: 30%

TASK DESCRIPTION:
- You will complete a ONE period in-class sighted test, consisting of both multiple choice, short and long answer questions for **40 marks.**
- You are required to prepare for this test by completing the preparation questions attached. The test questions will be based on the skills and concepts in the preparation questions and will be the same as the practice questions.
- Your preparation questions must be presented to your teacher prior to the start of the test for feedback and reporting purposes. They are worth **10 marks.**
- You will be given the HSC Mathematics Standard Reference Sheet. No other notes may be used in the test.
- You **may** be given class time to work on these questions.

The Topics assessed are:
- **F1.1: Interest and depreciation**
  - Chapter 3 Earning money and taxation
- **F1.2: Earning and managing money**
  - Chapter 3 Earning money and taxation
- **A1: Formulae and Equations**
  - Chapter 2 Formulas and Equations

Content:
MS-A1 Formulae and Equations
MS-F1 Money Matters

Recommended Equipment:
- NESA-approved scientific calculator – ONE WILL NOT BE GIVEN TO YOU IN THE TEST
- Pens, ruler, pencils

SYLLABUS OUTCOMES TO BE ASSESSED:

MS11-1   **uses** algebraic and graphical techniques to **compare** alternative solutions to contextual problems

MS11-2   **represents** information in symbolic, graphical and tabular form

MS11-5   **models** relevant financial situations using appropriate tools

MS11-6   makes **predict**ions about everyday situations based on simple mathematical models

MS11-9   ~~uses appropriate technology to investigate, organise and interpret information in a range of contexts~~ **THIS WILL NOT BE EXAMINED**

MS11-10   **justifies** a response to a given problem using appropriate mathematical terminology and/or calculations

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DIRECTIVES TO BE ASSESSED:

uses   to manipulate something for a particular purpose to solve mathematical problems

represents   communicates using mathematical notation

compare   to estimate, measure, or note the similarity or dissimilarity between.

model   to give a representation of a mathematical problem obtained

solve   to manipulate something for a particular purpose to find the answer for mathematical problems

justify   to provide evidence to support your solution

predict   to make an educated guess about future events

ASSESSMENT CRITERIA AND STUDENT CHECKLIST

Have you:

- Revised the above topics, ensuring you have referenced syllabus documents?
- Completed ALL relevant chapters in the textbook?
- Completed ALL the attached questions?
- Asked your teacher for clarification or help with any related class work?
- Used your class time to complete allocated classwork, as per CANVAS?

ASSESSMENT MARKING CRITERIA

MARKING GUIDELINES	GRADE
• Demonstrates extensive knowledge and skills appropriate to Mathematics Standard. • Demonstrates sophisticated multi-step reasoning and justification. • Integrates and applies ideas from across the course to successfully solve problems. • Demonstrates modelling and problem-solving skills in a wide range of familiar and unfamiliar contexts. • Communicates effectively using appropriate mathematical language and notation.	**A**
• Demonstrates thorough knowledge and skills appropriate to Mathematics Standard. • Demonstrates multi-step logical reasoning and justification. • Combines ideas from across the course to solve problems. • Demonstrates a range of modelling and problem-solving skills. • Communicates appropriately using mathematical language and notation.	**B**
• Demonstrates sound knowledge and skills appropriate to Mathematics Standard. • Uses logical reasoning and justifies answers. • Uses appropriate approaches to solve problems. • Communicates using mathematical language and notation.	**C**
• Demonstrates basic knowledge and skills appropriate to Mathematics Standard. • Applies reasoning in familiar contexts. • Solves simple problems. • Uses mathematical language and notation.	**D**
• Demonstrates limited knowledge and skills appropriate to Mathematics Standard. • Solves simple familiar problems with limited accuracy. • Uses some mathematical language, notation, diagrams and graphs.	**E**

Comments

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- **F1.1: Interest and depreciation**
  - Chapter 3 Earning money and taxation

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1. Part of a supermarket receipt is shown.
Determine the missing value, A and B, to complete the
Receipt.

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         SUPERMARKET
           RECEIPT

        Date: 22/09/2019

Description              $

*Chocolates 300 g      [  A  ]

Tomatoes 1 kg            5.00

Natural almonds 400 g  [  B  ]

Cheese slices 500 g      8.50

Milk 2 L                 3.20

Bananas 570 g            2.85


Total for 6 items       36.25

GST included in total    0.70


*GST of 10% is included in the price
 of item.
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2. An Italian suit costs €220 before VAT and €264 after VAT.

   a) What VAT is charged

   b) What percentage VAT is charged?

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3. A train ticket from Sydney to Newcastle costs $25.50 including 10% GST. What is the price of the ticket before tax?

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4. A hamburger costs $11.00 plus 10% GST. What is the hamburger selling price?

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5. Why can we find the GST paid on an item in Australia by simply dividing the selling price by 11?

- **F1.2: Earning and managing money**
  - Chapter 3 Earning money and taxation

1. The table shows personal income tax rates for different taxable incomes for a particular country.
A person with a taxable income of
$90 000 pays 25.8% of that income in tax (excluding any levies).
What is the value of X in the table?

Taxable income	Tax payable
$0 – $11 000	Nil
$11 001 – $42 400	20 cents for each $1 over $11 000
$42 401 – $78 800	$6280 plus 33 cents for each $1 over $42 400
$78 801 – $108 400	$18 292 plus X cents for each $1 over $78 800
$108 401 and over	$31 316 plus 48 cents for each $1 over $108 400

2. Tian is paid $20.45 per hour, as well as a meal allowance of $16.20 per day.
What are Tian's total earnings if she works 9 hours per day for 5 days?

3. Calculate the weekly wage of Harry who is paid piecework based at a rate of 45 cents for each piece if Harry produces 1250 pieces each week.

4. Mr Smith earns 9% royalties for the sale of his books. If the sales for the month were $56 780, what was Mr Smith's payment for that month?

5. Mr Jones works as a teacher. His salary is$82 560 per annum. Express his salary as an amount:
   a) per month
   b) per fortnight
   c) per week

6. On a long weekend, John is paid time-and-a half on Sunday and double time on Monday.
How much does John earn for working 9 hours on each of the days if his normal pay is $22.54 per hour?

7. A real estate charges the following commission for selling properties, based on a sliding scale of property prices:
   - 2% for the first $500 000
   - 1.5% for anything over $500 000

What commission will the real estate earn for selling:

   a) an apartment for $342 400?
   b) a villa for $620 000?

8. A nurse earns a salary of $88 750. Calculate his annual leave loading for 4 weeks of holiday pay.

9. Alice earns $827.25 per week and has the following deductions from her gross wage:
Tax $244.04, superannuation $64.83, union fees $18.20 and health fund $26.15.
What is Alice's net pay?

10. The owners of a business have both permanent and casual working.
They give their casual staff a bonus of $480 each at Christmas, while their permanent staff receive a holiday loading of 17.5% of their pay for 4 weeks.
   a) If the normal weekly pay for the permanent staff is $950, how much holiday loading do they receive for their 4 weeks of holidays?
   b) Who receives the better holiday amount, permanent or casual staff? Justify your answer mathematically.

11.

Tori is trying to decide which one of three jobs to take.

	Conditions	Pay
Job 1	38-hour week, 5 days per week, possibility of overtime	$19/hour
Job 2	75 hours per fortnight, work 9 days per fortnight	$1450 per fortnight
Job 3	Salary, based on a 35-hour week	$38 800 p.a.

a Ignoring any overtime, which job pays the most per year?

b If you were Tori, which job would you take? Why?

12.

Bill and Rose are a couple both aged 20 years. Bill's fortnightly taxable income is $721.70 but Rose is unable to work and she receives a disability support pension of $201.35 per fortnight. Recently, Rose received a letter from Centrelink informing her that for the last year she has been overpaid. The details included in the letter are:

- Pension received: $5235.10

- Entitled: $3614.25

- Overpaid amount: $1620.85.

The maximum, fortnightly disability pension for a member of a couple aged under 21 years is $562.20 and this amount reduces by 50% of the couple's fortnightly taxable income.

Are the details included in the letter correct? Justify your answer.

13. The Medicare levy for Australian residents is 2% of taxable income. Calculate the Medicare levy for a person who earns $72397 per year.

14.

The table shows the income tax rates for the 2020–2021 financial year.

William has a gross annual salary of $84 000. He has allowable tax deductions of $900 for home-office equipment and $474 for union fees.

Taxable income	Tax payable on this income
0 – $18 200	Nil
$18 201 – $45 000	19 cents for each $1 over $18 200
$45 001 – $120 000	$5092 plus 32.5 cents for each $1 over $45 000
$120 001 – $180 000	$29 467 plus 37 cents for each $1 over $120 000
$180 001 and over	$51 667 plus 45 cents for each $1 over $180 000

William must also pay a Medicare Levy of 2% of his taxable income.

Calculate the total tax payable by William including the Medicare Levy.

- **A1: Formulae and Equations**
    - Chapter 2 Formulas and Equations

The following formulae are often examined at HSC level:

calculate required medication dosages for children and adults from packets, given age or weight, using Fried's, Young's or Clark's formula as appropriate AAM ☞

- Fried's formula: $\text{Dosage for children 1-2 years} = \dfrac{\text{age (in months)} \times \text{adult dosage}}{150}$

- Young's formula: $\text{Dosage for children 1-12 years} = \dfrac{\text{age of child (in years)} \times \text{adult dosage}}{\text{age of child (in years)} + 12}$

- Clark's formula: $\text{Dosage} = \dfrac{\text{weight in kg} \times \text{adult dosage}}{70}$

1.Using the Clark's formulae above:

For a particular medicine, the adult dosage is 325 mg and the correct dosage for a specific child is 90 mg. How much does the child weigh, to the nearest kg?

2.Tyson is 18 months old and weighs 13.5 kg. The adult dosage of a drug is 20g. Calculate Tyson's dosage using:
   a) Fried's rule
   b) Young's rule

3.Expand the following:
   a) $3(a - 6)$
   b) $-6n(4 - 2)$
   c) $3a(a + 5) - a(a + 2)$

4.The formula $C = \dfrac{5}{9}(F - 32)$ is used to convert temperatures between degrees Fahrenheit (°F) and degrees Celsius (°C).
Convert each of the following temperatures to Celsius.
   a) 100°F
   b) Normal body temperature of 98.6°F

5.Solve the following equations:
   a) $4d - 3 = 5$

   b) $\dfrac{4c}{10} = 6$

   c) $5a - 13 = 3a + 9$

   d) $4t = 3t + 4$

6. Which of the following equations has x = 5 as the solution?

   a) $x - 5 = 10$
   b) $5 - x = 10$
   c) $2x = 10$
   d) $2x = 10$

7. Simplify:

   a) $2x^2 + 3x + x^2 - 5x$

   b) $-2d \times 8cd$

   c) $(2x^3)^2$

   d) $\frac{24cd}{8dc}$

8. If $a = -3$ and $b = 10$ and $c = 6$

   a) $b^2 - c$

   b) $\sqrt{c + 3b}$

   c) $\frac{2ac}{3}$

9. Make b the subject of the following equation $a = 7(b + 3)$

10. Make x the subject $k = 4x + r$

Mathematics Standard 1
Mathematics Standard 2

REFERENCE SHEET

Measurement

Limits of accuracy

Absolute error $= \dfrac{1}{2} \times$ precision

Upper bound = measurement + absolute error

Lower bound = measurement − absolute error

Length

$$l = \frac{\theta}{360} \times 2\pi r$$

Area

$$A = \frac{\theta}{360} \times \pi r^2$$

$$A = \frac{h}{2}(a + b)$$

$$A \approx \frac{h}{2}(d_f + d_l)$$

Surface area

$$A = 2\pi r^2 + 2\pi rh$$

$$A = 4\pi r^2$$

Volume

$$V = \frac{1}{3}Ah$$

$$V = \frac{4}{3}\pi r^3$$

Trigonometry

$$\sin A = \frac{\text{opp}}{\text{hyp}}, \quad \cos A = \frac{\text{adj}}{\text{hyp}}, \quad \tan A = \frac{\text{opp}}{\text{adj}}$$

$$A = \frac{1}{2}ab\sin C$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Financial Mathematics

$$FV = PV(1 + r)^n$$

Straight-line method of depreciation

$$S = V_0 - Dn$$

Declining-balance method of depreciation

$$S = V_0(1 - r)^n$$
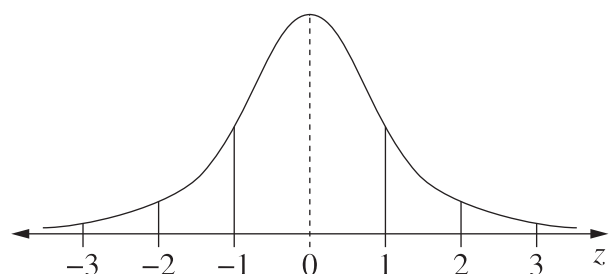
Statistical Analysis

An outlier is a score

 less than $Q_1 - 1.5 \times IQR$
 or
 more than $Q_3 + 1.5 \times IQR$

$$z = \frac{x - \mu}{\sigma}$$

Normal distribution

- approximately 68% of scores have z-scores between −1 and 1
- approximately 95% of scores have z-scores between −2 and 2
- approximately 99.7% of scores have z-scores between −3 and 3