



Full name: _____

Teacher: _____

Due date: _____

Orange High School

Year 11 Standard Mathematics

Task 2 Assignment 2019

Outcomes Assessed

MS11-3: solves problems involving quantity measurement, including accuracy and the choice of relevant units

MS11-4: performs calculations in relation to two-dimensional and three dimensional figures

MS11-5: models relevant financial situations using appropriate tools

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

Weighting **30%**

Due: This assignment is due to your classroom teacher 2 weeks from the date received (Term 2 Week 9).

Penalties as per assessment booklet

Failure to submit the assignment within the negotiated timeframe may result in an N-award in Standard Mathematics.

Year 11 Standard Mathematics Assignment

Nature of the task

This assignment requires students to apply what they have learnt in class to a real world context. In Section 1, students will need to research the income for a job of their choosing and then answer questions about income and taxation for that job. In Section 2, students will be required to help solve problems relating to the construction of multiple facilities for the 2020 Olympics in Tokyo.

Hand-in components of this task

Students will be required to complete the questions on separate A4 sheets of paper. They will need to hand in a hard copy of their calculations which addresses all the criteria outlined in this booklet.

Marking criteria

A marking rubric is provided at the back of this booklet.

You will be assessed on how well you:

- Accurately solve a variety of problems based on the scenarios.
- Select and use the appropriate mathematical processes, technologies and language to investigate questions from the Financial Mathematics and Measurement Units.
- Provide reasoning and justification related to the problems.

Section 1 – Earning and Managing Money (18 marks)

For this section of the assignment you will need to research a job of your choosing and then answer questions about income and taxes for that job.

Your job and calculations are not to be the same as any other student's assignment.

Income

1. Choose a realistic job for people aged between 16 and 25 that earns over \$19000 p.a. This could be full time employment, working from home or flexible working hours. 1
 - a. Write the job title and give a reason why you have chosen this job.

2. Research the amount this job will pay annually. 1
 - a. Write the advertised wage or award wage or salary for this type of job. Paste in evidence for your answer above. e.g. newspaper clipping or website screenshot.

3. Using your answer to part 2, calculate: 1
 - a. Your gross weekly pay 1

 - b. Your gross fortnightly pay 1

 - c. Your gross monthly pay 1

4. You are paid a 17.5% leave loading on four weeks of normal pay. 2

Calculate your total leave loading.

Taxation

5. PAYG

Use the “Tax withheld for individuals calculator” on the Australian Tax Office website to determine your PAYG. Leave defaults where possible. e.g. “Has the payee provided a Tax File Number?”

Print out a screenshot of the result of the calculator (or the tax tables) and attach it to your assignment.

- a. How much tax will be taken out of your fortnightly pay for PAYG instalments? 1

- b. Calculate your fortnightly **net** pay. 1

- c. How much money will you have paid in PAYG instalments for the financial year? 1

6. Allowable deductions

Find the allowable deductions part of the ATO website that relates to your job (from question 2)

- a. Create a table similar to that below and list at least four deductions you may claim and the amount you can claim for each deduction **2**

Allowable Deductions	Amount you will claim per year

- b. Using your salary from part 2 and the deductions listed above, calculate your annual taxable income. **1**

7. Tax and Medicare levy.

Taxable income	Tax payable
0–\$18 200	Nil
\$18 201–\$37 000	Nil + 19 cents for each \$1 over \$18 200
\$37 001–\$87 000	\$3572 + 32.5 cents for each \$1 over \$37 000
\$87 001–\$180 000	\$19 822 + 37 cents for each \$1 over \$87 000
\$180 001 and over	\$54232 + 45 cents for each \$1 over \$180 000

- a. Find your tax payable for a financial year. **2**

- b. Calculate your Medicare Levy for the financial year. **1**

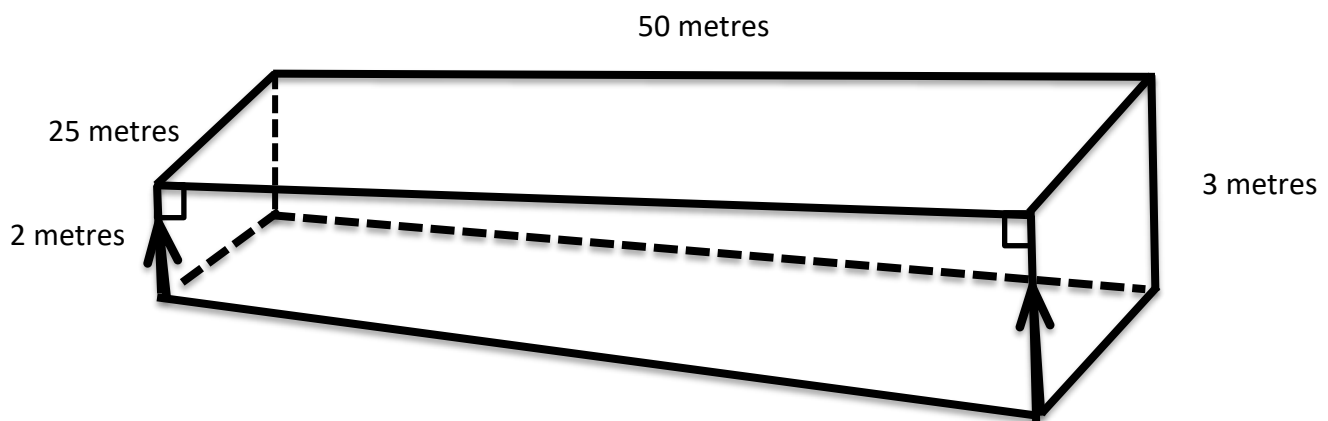
8. Tax payable or refund

Will you receive a tax refund or will you end up with a tax bill? Justify your answer, referring to the appropriate calculations you have made in Questions 6 and 7. **2**

Section 2 – Measurement (18 marks)

The Tokyo 2020 Olympics are just around the corner and the city is busy building the facilities required for the games.

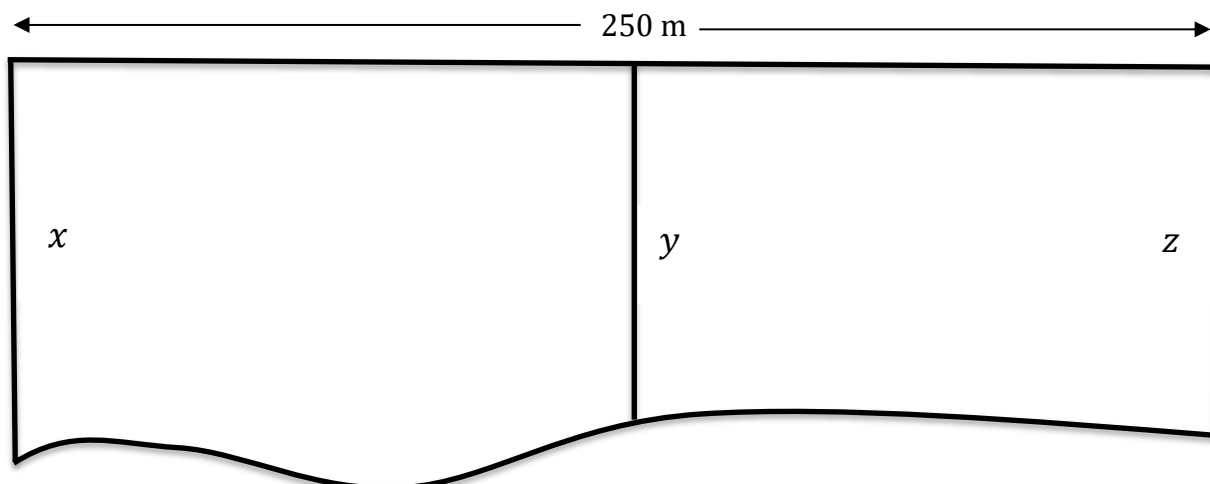
1. An Olympic-size swimming pool must meet FINA specifications to host events. Generally, the pool is 50 metres in length, 25 metres in width and can vary in depth. For this exercise, we will assume the pool is a trapezoidal prism with the shallow end being 2 metres deep and the deep end being 3 metres deep.



- a. If the pool length is measured to the nearest metre, what is the maximum error that could occur during measurement? **1**
- b. Calculate the volume of the pool using the dimensions in the image above. **2**
- c. How many kilolitres of water would be required to completely fill the pool? **1**
- d. If there was an error in the measurement of all the dimensions, calculate the largest possible volume. How many extra kilolitres of water would be needed to completely fill the pool compared to that in part c? (add your answer in part a. to each of the dimensions and then follow the procedures for parts b. and c. again). **3**
- e. The hosts are going to trial new tiles inside the pool that claim to be mould-proof. This means they will never have to clean the pool again. They are going to lay them on the bottom of the pool and on all the four walls. If each tile is a 10 cm x 10cm square, how many tiles will they need to order? **4**

2. Another facility in Tokyo that needs to be constructed for Tokyo 2020 is the Kayak Slalom Course in Kasai Park.

Pictured below is the outline of the water course currently designed.



The water park at the Rio Olympics covered approximately 3 – 3.5 hectares in area.

- a. Convert 3 and 3.5 hectares to square metres. **1**

- b. If the facility at Kasai Park is to have an area within the limits for part a, what could be the missing dimensions of the figure pictured above? I.e. what could be the possible values for x , y and z such that using two applications of the trapezoidal rule will result in an answer between 3 and 3.5 hectares. Prove this with calculations. **3**

- c. During the competition, 7 pumps are used to create the white water. Each pump produces $16 m^3$ per second. How much water (in litres) will all 7 pumps produce during the games if they are used for 5 hours a day for one week. Express your answer in scientific notation and with 3 significant figures. **3**

Marking Rubric – Section 1

Outcomes	MS11-5:	models relevant financial situations using appropriate tools
Question	Marks	Description
1	0	<ul style="list-style-type: none"> • Occupation is not realistic for a new graduate (e.g. CEO of Australia post)
	1	<ul style="list-style-type: none"> • Occupation realistic and reason given
2	0	<ul style="list-style-type: none"> • Occupation stated with no evidence of research
	1	<ul style="list-style-type: none"> • Occupation and salary stated with evidence presented
3	0	<ul style="list-style-type: none"> • Not attempted
	1	<ul style="list-style-type: none"> • Only one of the calculations is correct
	2	<ul style="list-style-type: none"> • Both calculations are correct
	3	<ul style="list-style-type: none"> • All three calculations correct
4	0	<ul style="list-style-type: none"> • Incorrect response
	1	<ul style="list-style-type: none"> • Partially correct working out and answer for leave loading
	2	<ul style="list-style-type: none"> • Correct working out and answer
5	0	<ul style="list-style-type: none"> • P.A.Y.G. not calculated
	1	<ul style="list-style-type: none"> • P.A.Y.G. stated with no evidence of research
	2	<ul style="list-style-type: none"> • P.A.Y.G. calculated correctly and evidence is attached
	3	<ul style="list-style-type: none"> • PAYG and Net Pay calculated correctly
6	0	<ul style="list-style-type: none"> • No deductions listed
	1	<ul style="list-style-type: none"> • Two deductions listed
	2	<ul style="list-style-type: none"> • Four possible deductions listed and relevant to job
	3	<ul style="list-style-type: none"> • Annual Taxable income calculated
7	0	<ul style="list-style-type: none"> • Incorrect or non attempt
	1	<ul style="list-style-type: none"> • Partially correct working out and answer
	2	<ul style="list-style-type: none"> • All working out and Tax Payable answer are correct
	3	<ul style="list-style-type: none"> • All working out and answers are correct including Medicare Levy
8	0	<ul style="list-style-type: none"> • Incorrect response
	1	<ul style="list-style-type: none"> • Correct response with no explanation
	2	<ul style="list-style-type: none"> • Correct response with an explanation

Total for Financial Mathematics:

out of 18

Marking Rubric – Section 2

Outcomes	MS11-3	solves problems involving quantity measurement, including accuracy and the choice of relevant units
	MS11-4	performs calculations in relation to two-dimensional and three dimensional figures
	MS11-10	justifies a response to a given problem using appropriate mathematical terminology and/or calculations
Question	Marks	Description
1a	0	<ul style="list-style-type: none"> • Incorrect calculation of the maximum error
	1	<ul style="list-style-type: none"> • Correct calculation of the maximum error
1b	0	<ul style="list-style-type: none"> • No working correct and an incorrect response
	1	<ul style="list-style-type: none"> • Correct response with missing working, or correct working used with an incorrect response
	2	<ul style="list-style-type: none"> • Correct response with adequate working out.
1c	0	<ul style="list-style-type: none"> • Incorrect conversion of volume into capacity
	1	<ul style="list-style-type: none"> • Correct calculation of kilolitres required with adequate working
1d	0	<ul style="list-style-type: none"> • Incorrect response with no correct working
	1	<ul style="list-style-type: none"> • Working towards finding the correct volume of the shape with the new measurements
	2	<ul style="list-style-type: none"> • Correct working out and solution, but does not determine the extra amount of water required.
	3	<ul style="list-style-type: none"> • Correct working, has determined the new volume and the extra water required to now fill the pool.
1e	0	<ul style="list-style-type: none"> • Incorrect calculation of the surface area, has not converted the units correctly and has not determined the correct amount of tiles required.
	1	<ul style="list-style-type: none"> • Some correct working, or the conversion of units is completed correctly, or the number of tiles required for the listed answer is correct.
	2	<ul style="list-style-type: none"> • Correct calculation of the surface area, with an incorrect conversion of units and therefore the wrong amount of tiles required.
	3	<ul style="list-style-type: none"> • Correct calculation of surface area and the conversion of units, but has not found the number of tiles required.
	4	<ul style="list-style-type: none"> • Response has correctly solved the problem with adequate working.

2a	0	<ul style="list-style-type: none"> • Incorrect calculation of hectares to square metres.
	1	<ul style="list-style-type: none"> • Correctly converted 3 hectares to square metres and 3.5 hectares to square metres.
2b	0	<ul style="list-style-type: none"> • Incorrect or non-attempt
	1	<ul style="list-style-type: none"> • Values for x, y and z do not fit the criteria, but the student has correctly completed two applications of the trapezoidal rule.
	2	<ul style="list-style-type: none"> • Student has identified some correct values for x, y and z such that they meet the criteria, but there is minimal to no completed calculations of the rule.
	3	<ul style="list-style-type: none"> • All working out and values for x, y and z are correct.
2c	0	<ul style="list-style-type: none"> • Incorrect response
	1	<ul style="list-style-type: none"> • One of the following: correct volume with working, correct conversion to litres or correctly expressed with significant figures and scientific notation.
	2	<ul style="list-style-type: none"> • Two of the following: correct volume with working, correct conversion to litres or correctly expressed with significant figures and scientific notation.
	3	<ul style="list-style-type: none"> • Correct calculation of volume with working, has correctly converting to litres and has expressed their answer in scientific notation and to three significant figures.
Total for Measurement:		out of 18

Total: **out of 36**

Teacher's comment: