**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Year 11 2024 Mathematics Standard**

**Assessment Task 1**

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| **Investigative Assignment with Validation Task** **Part 1 - Preparation** |
| **Task number:** 1 | **Weighting: 30%** | **Due Date: Week 7Tuesday 12th March 2024**  |
| **Outcomes assessed:** MS11-1 uses algebraic and graphical techniques to compare alternative solutions to contextual problems MS11-6 makes predictions about everyday situations based on simple mathematical modelsMS11-9 uses appropriate technology to investigate, organise and interpret information in a range of contextsMS11-10 justifies a response to a given problem using appropriate mathematical terminology and/or calculations |
| **Nature and description of the task:** Students are given a portfolio of questions as a Preparation Activity. You will be required to investigate/attempt each of these questions and submit the solutions in the booklet on the due date.On the due date, Tuesday 12th March 2024, you will then receive a similar selection of questions to complete in one period in an in-class Validation Task. The final mark for this assessment (30% of your final grade) will be split between the take home component and the final in class validation.**Take home preparation section = 70%****In-class Validation section = 30%**NOTE: You will NOT have access to the Preparation Activity during the Validation Task. You will NOT be given any answers to the Preparation Activity. |
| **Non-Completion of Task:** If you know you are going to be away on the day of the Validation Task and are unable to complete it on the due day, then you must have supportive documentation. *Zero marks will apply if the Assessment Task is completed late, unless an Illness/Misadventure or Application for Extension Form has been submitted.* |

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**Part 1 Preparation Activity**

Investigate/attempt each of the following questions in preparation for the in-class Validation Task.

Show all reasonable mathematical working and/or calculations.

**Marks**

1. Let $x=4$ and $y=6$. What is the value of:
2. $3x-5y$ **1**

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1. $\sqrt{x^{2}+3y+2}$ **1**

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1. The volume, *V*, of a sphere is found using the formula $V=\frac{4}{3}πr^{3}$, where *r* is the radius. Find the volume of a sphere with radius 0.6 metres, rounding to one decimal place. **1**

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1. Solve the following equations:
2. $6a=24$ **1** **mark b)** $\frac{a}{3}=9$ **1 mark**

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 **c)** $4m+5=13$ **2 marks**  **d)** $\frac{x}{2}+4=15$ **2 marks**

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1. A patient is to receive 1200mL of fluid over 8 hours. What is the flow rate in mL/hour? **1**

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1. What is the distance a car travels in 2.8 seconds at 80 km/hr? **2**

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1. Solve each of the following equations:
2. $4\left(x-1\right)=12$ **2** **marks b)** $ 3\left(2x-1\right)+2\left(x+3\right)=27$ **3 marks**

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 **c)** $5w-2=3w+8$ **2 marks**  **d)** $\frac{3(y+4)}{5}=6+y$ **3 marks**

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1. **a)** Using the formula given, calculate the BAC of a 98kg male who has consumed six cans of drink, each 1.2 standard drinks, in 4 hours.

$$BAC\_{male}=\frac{(10N-7.5H)}{6.8M}$$

Where *N* is the number of standard drinks, *H* is the number of hours and *M* is the mass in kg. Round your answer to 3 decimal places. **1**

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1. How long must the male wait until he is able to drive at zero BAC? **1**

$$number of hours=\frac{BAC}{0.015}$$

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1. Using the formula below, find the stopping distance for a car travelling at 90 km/hr in good conditions. Assume a reaction time of 2.5 seconds.

$$d=\frac{5Vt}{18}+\frac{V^{2}}{170}$$

Where *d* is the stopping distance in metres, *V* is the velocity or speed of the motor vehicle in km/hr and
*t* is the reaction time in seconds.

**1**

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1. A patient is to receive 600mL of saline. An intravenous drip delivers 30 drops/min and there are 12 drops/mL. How many hours will it take to deliver the required dose?

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1. The formula to calculate the body mass index is $B=\frac{m}{h^{2}}$, where *m* is the mass in kilograms and *h* is the height of a person in metres.
2. Calculate a person’s body mass index if they weigh 58kg and are 176cm tall. Give your answer correct to 3 decimal places. **1**

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1. Rearrange the formula to make *m* the subject. **1**

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1. Calculate the mass of a person who is 196cm tall and whose body mass index is 19.5. Give your answer correct to the nearest kilogram. **1**

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1. The simple interest formula is given by $I=PRN$, where *P* is the principal, *R* is the rate of interest per year as a decimal, and *N* the number of years of the investment.
2. How much interest would you earn if you invested $15 000 at 3.2% p.a. for 2 years? **1**

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1. Calculate the interest earned on an investment at $8 500 at 2.8% p.a. for 15 months. **1**

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1. Change the subject of the formula to *R,* the interest rate per annum. **1**

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1. Your investment of $5 600 for 18 months earnt $210 in interest. Find the rate of interest as a percentage on your investment. **2**

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1. Use the formula $T=a+\left(n-1\right)d$ to find *n*, given that *T = 41, a = 3* and *d = 2.*

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1. Convert 55 km/hr to m/s

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1. George’s solution to the equation $6-5x=8$ is shown below. He has made some errors.

 Line 1: $6-5x=8$

 Line 2: $-5x=14$

 Line 3: $x=8$

1. Below, circle which line he made an error on. **1**

 A) Line 1 B) Line 2 C) Line 3 D) Line 2 & 3

1. Find the correct solution to George’s equation $6-5x=8$. **1**

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1. Make $y$ the subject of each of these equations.
2. $\frac{y}{3}=p$

**1**

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1. $\frac{y-x}{w}=2$

**2**

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1. $x=4-3y$

**3**

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1. The cost of taking a taxi *(C)* in dollars, includes an initial fixed charge of $3.50 plus $2 per km or part thereof. The equation for this is $C=2k+3.50$, where *k* is the distance travelled in km.
2. How much would it cost to travel 22 km?

**1**

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1. Ben paid $28.50 for his ride. How many kilometres did he travel in this taxi?

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1. The typical weight of a 10-year-old girl is 33 kg with a height of 138 cm. The adult dosage of a certain medication is 425 mg.
2. Calculate the dosage for the child, to the nearest mg, using:
	* 1. Fried’s formula

$$Dosage=\frac{Age of infant \left(months\right)×Adult dose}{150}$$

**2**

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* + 1. Young’s formula

$$Dosage=\frac{Age of child\left(years\right)×Adult dose}{Age of child\left(years\right)+12}$$

**2**

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* + 1. Clark’s formula

$$Dosage= \frac{Weight\left(kg\right)×Adult dose}{70}$$

**2**

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1. Are all of these formulae appropriate for this child? Justify your answer.

**2**

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**End of Preparation Activity**

**TOTAL = / 59**