

PICTON HIGH SCHOOL

Creating Opportunities Achieving Success



YEAR 12 Set Pathway Mathematics

Assessment Task 3 2020

Due Date: Thursday 13 th August 2020 Term 3 Week 4	Assessment Name: Assessment Task 3 - Investigation
Mark: /40	Weighting: 40 %

SYLLABUS OUTCOMES TO BE ASSESSED:

- MS1-12-1** uses algebraic and graphical techniques to **evaluate** and **construct arguments** in a range of familiar and unfamiliar contexts
- MS1-12-2** **analyses** representations of data in order to make **predictions** and **draw** conclusions
- MS1-12-3** **interprets** the results of measurements and calculations and **makes judgements** about their reasonableness
- MS1-12-6** **represents** the relationships between changing quantities in algebraic and graphical forms
- MS1-12-7** **solves** problems requiring statistical processes
- MS1-12-9** **chooses** and **uses** appropriate technology effectively and **recognises** appropriate times for such use
- MS1-12-10** uses mathematical **argument** and **reasoning** to evaluate conclusions, **communicating** a position clearly to others

DIRECTIVES TO BE ASSESSED:

- Evaluate:** Make a judgement based on criteria; determine the value of
- Analyses:** Identify components and the relationship between them; draw out and relate implications
- Predict:** Suggest what may happen based on available information
- Interpret:** draw meaning from the mathematical result
- Informed decisions:** to use information available to make a choice based on pros, cons and risks.
- Communicates:** Conveys and imparts knowledge
- Answer:** to provide a solution or result in response to a question
- Develops:** creates and builds on an idea or solution in response to or to answer a question
- Argument:** A reason or set of reasons given in support of an idea, action or theory
- Reasoning:** To use logical thinking to make sense of a situation or idea.
- Construct:** To draw a shape, line or angle accurately using a compass, ruler or geometrical instruments.
- Represent:** To show a general relationship that expresses similarities between objects.

TASK DESCRIPTION:

You will submit the 3 investigations as outlined below. Detailed instructions and marking criteria are on the following pages. Each part will be started in class but must be finished outside of class.

Part 2 must be submitted via Google Classroom. Parts 1 and 2 may be completed on paper and attached.

PLEASE SUBMIT THIS DOCUMENT ON THE DUE DATE AS IT HAS YOUR MARKING CRITERIA.

The 3 parts are:

- a) Bivariate Data S3.2 (Ch 5): Body Measurements (12 marks)
- b) Rates M4 (Ch 7, Ch 10): Heart Rate and Blood Circulation (19 marks)
- c) Graphs of Practical Situations A3.2 (Ch 6): Exponentials in Health and Finance (9 marks)

Recommended Equipment:

- ❖ NESAs approved scientific calculator
- ❖ Pens, ruler, pencils
- ❖ Grid paper – can be provided by your teacher
- ❖ Internet-connected device eg laptop computer (will be provided in class during some lessons)

ASSESSMENT CRITERIA – STUDENT CHECKLIST:

Have you:

- Attended all classes or caught-up when absent?
- Referred to the above chapters?
- Checked Google Classroom and the Y12 Maths Standard 1 Google Site for lesson content?
- Referred to the Marking Criteria below?
- Asked your teacher for clarification or direction with any problems?
- Attended the Maths / STEM Staffroom for help if needed?

Part 1. Bivariate Data: Body Measurements and Vitruvian Man (12 marks).

Circle: Paper attached or Google Classroom.

- a) Create a suitable table to record names and 2 of the following measurements for *10 people*. (2 marks)
- b) Measure and record 2 of the following, to the nearest cm: arm span, height, foot length, hand span, head circumference, leg length, arm length, waist measurement. (3 marks)
- c) Create a scatterplot to represent the relationship between the variables. (5 marks)
- d) Construct a line of best fit for the data. (2 marks)

Marking Criteria: Part 1

Question	Marks	Description
a. Table	2	Clear table, column headings, neat.
	1	One element above is missing.
	0	Missing or totally incorrect.
b. Measurements	3	10 people measured, nearest cm, names, both measurements.
	2	1 element above is missing.
	1	2 elements above are missing.
	0	Missing or totally incorrect.
c. Scatterplot	5	Title, axes labelled, appropriate scales, data correctly plotted, data complete – digital or paper.
	4	1 element above is missing.
	3	2 elements above are missing.
	2	3 elements above are missing.
	1	4 elements above are missing.
d. Line of Best Fit	2	Straight line, correctly placed – digital or paper.
	1	1 element above is missing.
	0	Missing or totally incorrect.

Total = / 12 Comment:

Part 2. Rates: Heart Rate and Blood Circulation (19 marks)

This part must be submitted on Google Classroom.

- a) Open the spreadsheet **“Pulse Rates”** from Google Classroom. Save with appropriate file name. (1 mark)
- b) Use the formula for maximum heart rate (males): **“220 – age in years”** or **“226 – age in years”** (females) to complete the **“Maximum Pulse”** column (2 marks)
- c) Use formulas to calculate the minimum and maximum heart rate for the **“Weight Loss”**, **“Aerobic”** and **“Anaerobic”** columns for ages up to 100. (7 marks)
- d) Measure your resting heart rate. Record clearly on the spreadsheet in beats per minute. (2 marks)
- e) Now jog up and down some stairs or similar light exercise for one minute. Record your heart rate on the spreadsheet again. (2 marks)
- f) Use your age and gender to calculate your maximum heart rate (1 mark)
- g) Calculate what percentage of your maximum heart rate you were at after exercise (2 marks).
- h) Which of the three categories of exercise were you in? (1 mark)
- i) Based on this result, predict what would be the result for you, if you continued this activity for 30 min, four times per week, for 6 weeks. (1 mark)

Marking Criteria: Part 2

Question	Marks	Description
a. File name	1	Suitable file name
	0	Missing or unsuitable
b. Max pulse	2	Complete column, formula used and filled down.
	1	1 element above is missing.
	0	Missing or totally incorrect.
c. Exercise type columns	7	6 formulas used, all filled down to 100
	6	1 element above is missing.
	5	2 elements above are missing.
	4	3 elements above are missing.
	3	4 elements above are missing.
	2	5 elements above are missing.
	1	6 elements above are missing.
0	Missing or totally incorrect.	
d. Resting Heart Rate	2	Clearly recorded with calculation shown – spreadsheet formula or manual
	1	1 element above is missing.
	0	Missing or totally incorrect.
e. Exercise Heart Rate	2	Clearly recorded with calculation shown – spreadsheet formula or manual
	1	1 element above is missing.
	0	Missing or totally incorrect.
f. MHR	1	Clearly stated with calculation shown – spreadsheet formula or manual
	0	Missing or totally incorrect.
g. Percentage of MHR	2	Clearly stated with calculation shown – spreadsheet formula or manual
	1	1 element above is missing.
	0	Missing or totally incorrect.
h. Exercise Category	1	Correct Answer, according to table
	0	Missing or incorrect
i. Prediction	1	Answer sensible, according to exercise category
	0	Missing or not supported by category

Total = / 19 Comment:

Part 3. Graphs of Practical Situations: Exponentials in Health and Finance (9 marks)

Individual data will be provided by your teacher in class.

Use grid paper or a spreadsheet to do this part.

You win \$..... and invest it at a compound interest rate of% compounded annually.

- a) Create a table or spreadsheet to show the exponential growth of your account balance (A) for time (t) values of 0 to 20 years (2 marks)
- b) Graph this data over the same timeframe as a line graph (5 marks)
- c) How long did (or will) it take you to double your money? (1 mark)
- d) How much will you have when you retire at the age of 70? (1 mark)

Marking Criteria: Part 3

Question	Marks	Description
a. Table of values	2	Table complete: t values from 0 to 20, A values to match are correct – manual or spreadsheet
	1	One element above is missing.
	0	Missing or totally incorrect.
b. Line Graph	5	Title, axes labelled, appropriate scales, data correctly plotted, data complete – manual or spreadsheet .
	4	1 element above is missing.
	3	2 elements above are missing.
	2	3 elements above are missing.
	1	4 elements above are missing.
0	Missing or totally incorrect.	
c. Doubling	1	Correct from table or sensible prediction
	0	Missing or totally incorrect.
d. Retirement	1	Correct prediction using formula or extending table and graph
	0	Missing or totally incorrect.

Total = / 9 Comment: