Full name: _____

Teacher: _____

Due date: _____

YEAR 8 MATHEMATICS

Assignment 1

2020

Outcomes Assessed		
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 **Cross Curricular:** • **EN5-1A** responds to and composes increasingly sophisticated and sustained texts for understanding, interpretation, critical analysis, imaginative expression and pleasure • **GE5-2** explains processes and influences that form and transform places and environments • **PD5-5** appraises and justifies choices of actions when solving complex movement challenges		
Content Assessed		
Refer to the attached assignment booklet and instructions. Each student is to complete tasks of their choosing.		
Weighting	**15%**	**Due:** This assignment is due to your classroom teacher 2 weeks from the date received (due in Week 7).

Gardner's Multiple Intelligences and Revised Blooms Taxonomy

This assignment has been designed to give all students an opportunity to best demonstrate their ability in Mathematics. Students can choose from tasks aligned to the different categories of Gardner's Multiple intelligences. The tasks are also aligned to the Revised Bloom's Taxonomy - a multi-tiered model of classifying thinking according to six cognitive levels of complexity.
Thus, students can choose tasks according to their preferred modes of learning, or try different styles of learning. Students are also able to revise and explore key concepts of this unit by completing lower-order tasks and then challenge themselves to develop their understanding and skills by completing higher-order tasks.

Instructions

You do not have to answer all the questions!
Each box in the Task Grid (on the next page) is a task.

1. **8MA1 and 8MA2** must include at least two tasks from the *creating* column and at least two tasks from the *evaluating* columns as part of their **35 marks**.
2. **8MA3, 8MA4, 8MA6, 8MA7 and 8MA8** must include at least one task from the *creating* column and at least one task from the *evaluating* columns as part of their **30 marks**.
3. **8MA5** must complete a total of **25 marks**.
4. Most tasks will require you to write your answers on separate A4 paper that you will need to provide. Please clearly write your full name and the task number. Answer in sequential order. Use a separate sheet of A4 paper for each question.
5. Please highlight on the Task Grid which tasks you are completing.

Marking

Marks are awarded based on the difficulty and amount of work required to complete each task. Marking guidelines are provided under each task description.

Task rid

Multiple Intelligences	Bloom's Taxonomy: Six Thinking Levels					
	Knowing	**Understanding**	**Applying**	**Analysing**	**Creating**	**Evaluating**
Verbal/Linguistic I enjoy reading, writing & speaking	1) Sports (1 mark)	2) Grid Reference (2 marks)	3) Directions (2 marks)	4) History of the games (3 marks)	5) Ticket Prices (3 marks)	6) Event Packages (4 marks)
Logical/ Mathematical I enjoy working with numbers & science	7) Oldest Record (1 mark)	8) Fastest Time (2 marks)	9) Pool Volume (2 marks)	10) Race Track (3 marks)	11) Olympic Games – Logos (4 marks)	12) Soccer Champ (3 marks)
Visual/Spatial I enjoy painting, drawing & visualising	13) The Australian Medal Tally (3 marks)	14) Interpreting Sector Graphs (3 marks)	15) Host Regions (3 marks)	16) Missing Host Region (2 marks)	17) Design Olympic Village (5 marks)	18) Staggered Start (5 marks)
Bodily/Kinaesthetic I enjoy doing hands-on activities, sports & dance	19) Olympic Measures (2 marks)	20) Running Times (3 marks)	21) Survey (2 marks)	22) What can you achieve? (3 marks)	23) 200m event (4 marks)	24) Medals Count (3 marks)
Technology I enjoy using computers	25) Countries not in the Olympics (2 marks)	26) Cost of Infrastructure (2 marks)	27) Graphing costs (3 marks)	28) Alternative Records (4 marks)	29) Star Athlete (4 marks)	30) Kahoot (3 marks)

Task Details

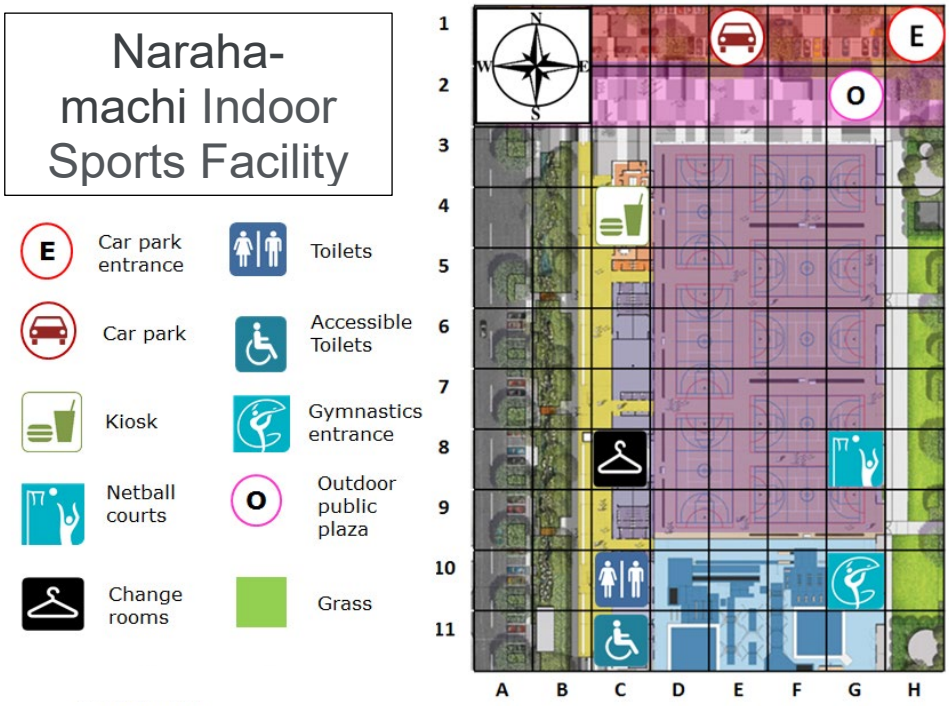
Verbal/Linguistic

1) Sports (1 mark)

List 10 sports included in the 2020 Olympic Games

Marking	
1/2mark	5 or less sports listed
1 mark	10 sports included

Use this image to answer questions 2 and 3



2) Grid Reference (2 marks)

Where will you be if you are at the following grid references in the table below? Add the answers to the table.

Grid reference	Location
(G, 8)	
(H, 10)	
(C, 10)	
(G, 2)	

Marking	
½ mark	each correct location
2 marks	All answers correct

3) Directions (2 marks)

You have just arrived at the Naraha-machi Indoor Sports Facility . Write directions for the most efficient path from the car park to the netball courts going via the toilets.

Marking	
1 mark	Correct directions from the carpark to the toilet only
2 marks	Correct directions from the toilet to the netball courts

4) History of the Games (3 marks)

The Olympic Games is an international multi-sport event involving athletes from across and around the World.

Write a 300 word history of the Olympic Games. Make sure you mention when the games started and how many countries participate in it now.

Marking	
1 mark	Appropriate length
1 mark	Relevant information provided
1 mark	Appropriate spelling and Grammar

5) Ticket prices (3 marks)

Out of the three events mentioned below, create a package which provides the best experience and value-for-money for a family of four (2 adults, 2 children). Justify your answer with calculations and reasoning.

Ticket prices can be found below:

Swimming Ticket Pricing - All Sessions

	Category A		Category B		Category C		Category D	
	Adult	Child	Adult	Child	Adult	Child	Adult	Child
Swimming (Prelim)	$80	$40	$60	$30	$20	$10	n/a	n/a
Swimming (Finals)	$120	n/a	$80	n/a	$40	$20	n/a	n/a

i. Preliminary Session – Swimming – category A

ii. Finals Session – Swimming – category B

iii. Finals Session – Swimming – category C

Marking	
1 mark	Correct and relevant calculations
1 mark	Appropriate conclusion for the selection
1 mark	Appropriate reasoning for the selection

6) Event Package (4 marks)

Using a budget of $3,000**,** design a package of event options for a family of four (2 adults, 2 children). The package must include tickets to either the Opening or Closing Ceremony and a minimum of 4 events.

Ticket prices can be found below

Event	Cost (Child)	Cost (Adult)
Opening Ceremonies	300	500
Closing Ceremonies	400	600
Taekwondo	40	60
Swimming	80	100
BMX racing	20	20
Rock Climbing	30	50
Athletics (preliminary)	45	75
Athletics (finals)	65	95
Ping Pong	35	55
Judo	50	80

Display your budget in a table such as the one shown below

Event	Cost for 2 adults	Cost for 2 children	Total

Marking	
1 mark	Table completed with some correct calculations
1 mark	Table completed with all correct calculations
1 mark	Budget adhered to
1 mark	Minimum of 4 events including the opening or closing ceremony

Logical/Mathematical

The table below shows the Olympic Records for the Men's athletics events. Use the table to answer Questions 7 and 8

Event	Record	Athlete(s)	Nation	Games	Date
100 metres	9.63	Usain Bolt	Jamaica (JAM)	2012 London	August 5, 2012
200 metres	19.30	Usain Bolt	Jamaica (JAM)	2008 Beijing	August 20, 2008
400 metres	♦43.03	Wayde van Niekerk	South Africa (RSA)	2016 Rio de Janeiro	August 14, 2016
800 metres	♦1:40.91	David Rudisha	Kenya (KEN)	2012 London	August 9, 2012
1,500 metres	3:32.07	Noah Ngeny	Kenya (KEN)	2000 Sydney	September 29, 2000
5,000 metres	12:57.82	Kenenisa Bekele	Ethiopia (ETH)	2008 Beijing	August 23, 2008
10,000 metres	27:01.17	Kenenisa Bekele	Ethiopia (ETH)	2008 Beijing	August 17, 2008
Marathon	2:06:32	Samuel Wanjiru	Kenya (KEN)	2008 Beijing	August 24, 2008
110 metres hurdles	12.91	Liu Xiang	China (CHN)	2004 Athens	August 27, 2004
400 metres hurdles	♦46.78	Kevin Young	United States (USA)	1992 Barcelona	August 6, 1992
3,000 m steeplechase	8:03.28	Conseslus Kipruto	Kenya (KEN)	2016 Rio de Janeiro	August 17, 2016
4×100 m relay	♦36.84	Nesta Carter Michael Frater Yohan Blake Usain Bolt	Jamaica (JAM)	2012 London	August 11, 2012
4×400 m relay	2:55.39	LaShawn Merritt Angelo Taylor David Neville Jeremy Wariner	United States (USA)	2008 Beijing	August 23, 2008
20 km walk	1:18:46	Chen Ding	China (CHN)	2012 London	August 4, 2012
50 km walk	3:36:53	Jared Tallent	Australia (AUS)	2012 London	August 11, 2012
High jump	2.39 m	Charles Austin	United States (USA)	1996 Atlanta	July 28, 1996
Long jump	8.90 m	Bob Beamon	United States (USA)	1968 Mexico City	October 18, 1968
Pole vault	6.03 m	Thiago Braz da Silva	Brazil (BRA)	2016 Rio de Janeiro	August 15, 2016
Triple jump	18.09 m	Kenny Harrison	United States (USA)	1996 Atlanta	July 27, 1996
Shot put	22.52 m	Ryan Crouser	United States (USA)	2016 Rio de Janeiro	August 18, 2016
Discus throw	69.89 m	Virgilijus Alekna	Lithuania (LTU)	2004 Athens	August 23, 2004
Hammer throw	84.80 m	Sergey Litvinov	Soviet Union (URS)	1988 Seoul	September 26, 1988
Javelin throw	90.57 m	Andreas Thorkildsen	Norway (NOR)	2008 Beijing	August 23, 2008
Decathlon	8893 pts	Roman Šebrle	Czech Republic (CZE)	2004 Athens	August 24, 2004
		Ashton Eaton	United States (USA)	2016 Rio de Janeiro	August 18, 2016

7) Oldest Record (1 mark)

Which event/s have records that have stood for the longest length of time?

Marking	
1 mark	Correctly identified events/records

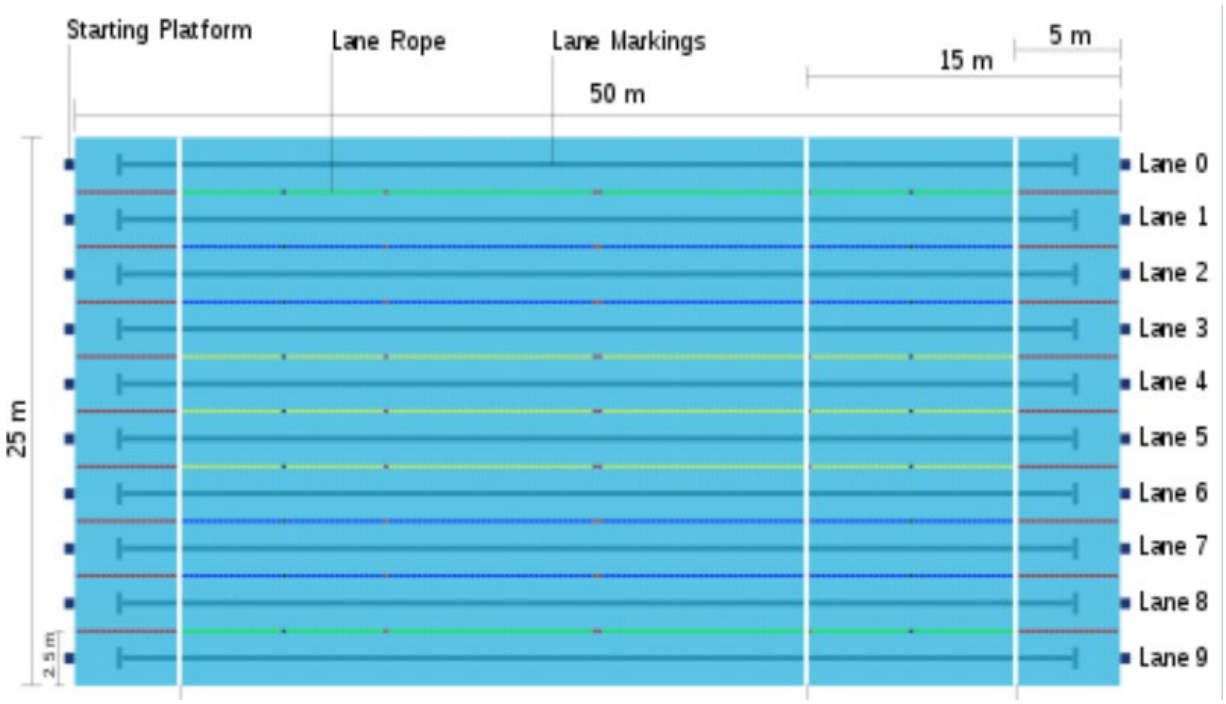
8) Fastest Time (2 marks)

If the 400m record holder ran the 100m event, how long would you expect it to take him? How does this time compare with the record of 9.63 seconds?

Marking	
1 mark	Correct calculation of time with working out
1 mark	Correct statement in comparing the timings

9) Pool Volume (2 marks)

The Tokyo Aquatic Centre located in Tatsumi Seaside Park will host the swimming and diving events at the Olympic Games. There is one Olympic sized swimming pool in the centre that will need to be refilled. This pool has 10 lanes, each 2.5m wide and is 2m deep. A diagram of the pool is shown below.

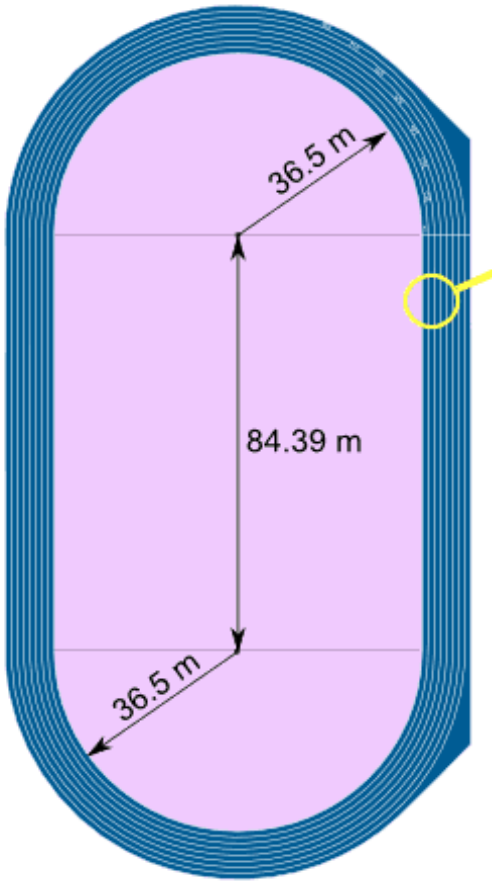


Calculate the volume of the pool in Litres, showing all working.

Marking	
1 mark	Correct calculation of volume, with working out
1 mark	Answer converted to litres

10) Race Track (3 marks)

The National Stadium (新国立競技場) will play host to the athletics during the Olympic Games. In order to make this stadium ready, a 400m track will need to be installed. The dimensions of the track are shown below.



The inside lane, lane 1 should be 400m long. When calculating the distance, the rules state that you measure 0.3 m from the inner edge of the lane as this is the "running position".

Will this track be 400m long? (hint: you will need to calculate the perimeter). Show all of your working.

Marking	
1 mark	Correct measurement used for radius
1 mark	Correct calculation of circumference
1 mark	Correct calculation of total track length and conclusion

11) Olympic Games Logo (4 marks)

The Olympic Games is a collective of diverse nations spread across almost every continent and ocean and makes up the majority of the world's population. From Asia to Africa and beyond, the Olympic Games is composed of a rich variety of faiths, races, languages, cultures and traditions.

The goal of the Olympics is to contribute to building a peaceful and better world by educating youth through sport practiced without discrimination of any kind and in the Olympic spirit, which requires mutual understanding with a spirit of friendship, solidarity and fair play.

Your task is to design logo for the Olympic games that portrays the amazing history and has a significance of forward or future directions. You are to first create a sketch of your logo. This sketch is to then be enlarged using a scale factor of two. Present your logo on an A4 word document.

Marking	
1 mark	Unique logo design
1 mark	Significance of Olympic games and future ideas
1 mark	Sketch drawn
1 mark	Logo enlarged using a scale factor of two

12) Soccer Champ (3 marks)

Three teams A, B and C have each played two matches. Three points are given for a win and one point to each team for a draw. The table below gives the total number of points and goals scored for and against each team. Fill in the table and find the scores in each match.

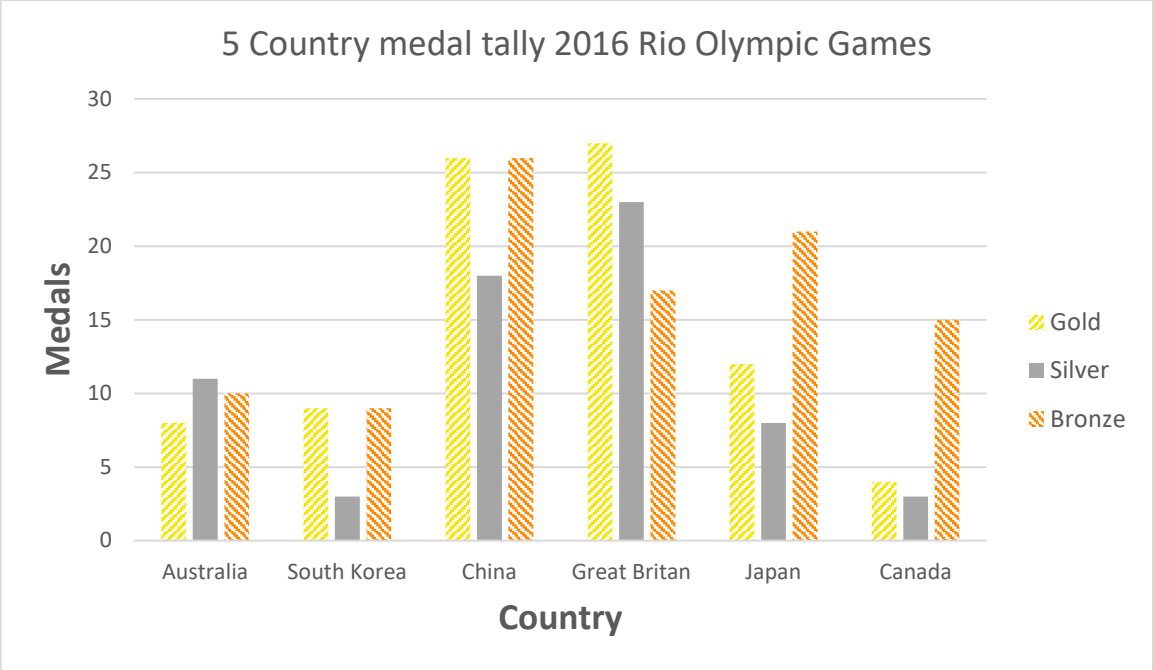
Teams	Games Played	Won	Drawn	Lost	Goals for	Goals Against	Points
A	2				5	3	3
B	2				2		1
C	2				3	2	4

Marking	
1 mark	Team A Correct
1 mark	Team B Correct
1 mark	Team C Correct

Visual/Spatial

13) The Australian medal tally (3 marks)

The Australian medal tally and five other countries achievements from the 2016 Rio Olympic Games is displayed on the side-by-side column graph below. Use the graph to answer the following questions.



a) 'Country' is one of the variables shown on the graph. What is the other variable?

b) What are the top three silver medal winning countries?

c) Which country won the most gold medals?

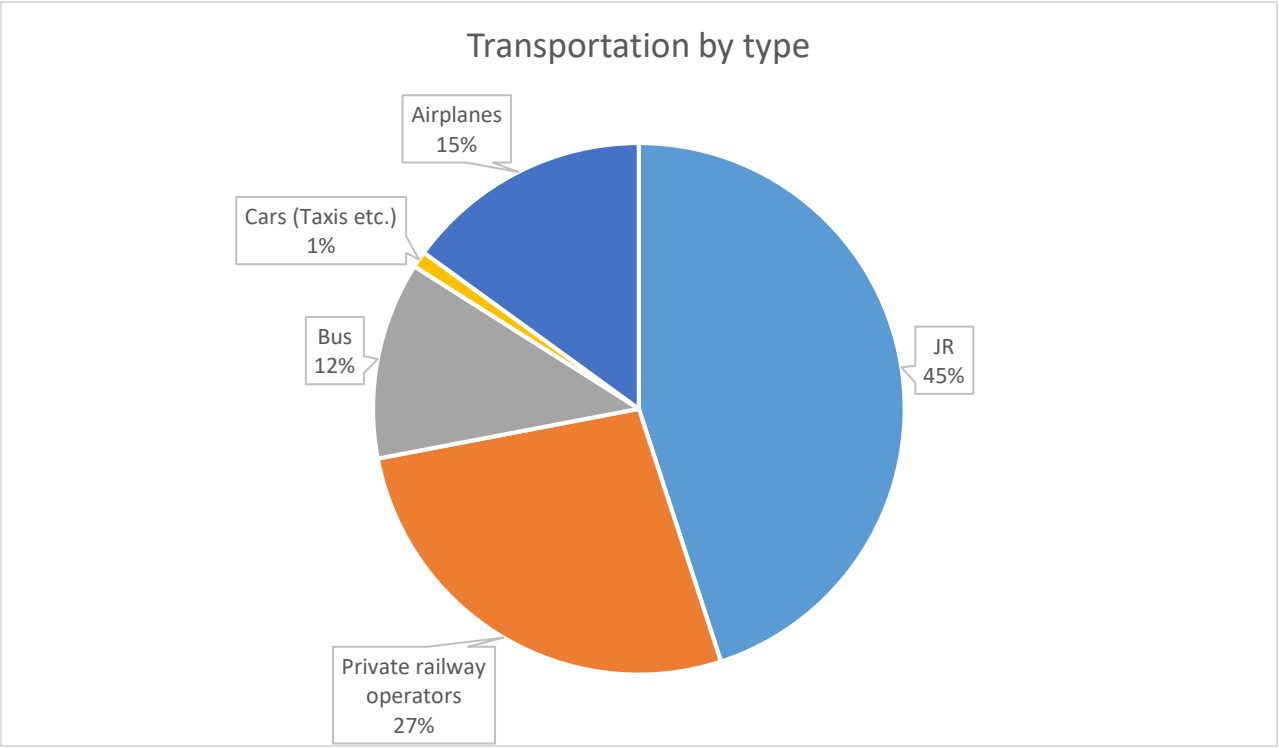
d) Which country won the least number of gold medals?

e) Provide two reasons why China won the most total medals.

Marking	
2 marks	Correct responses for a) to d) (1/2 mark each)
1 mark	Correct reasons part e)

14) Interpreting a Sector Graph (3 marks)

The pie graph below represents the forms of transportation commonly used by transportation type across Japan. (Note: JR is "Japan Rail" for Publicly Held Railway systems)

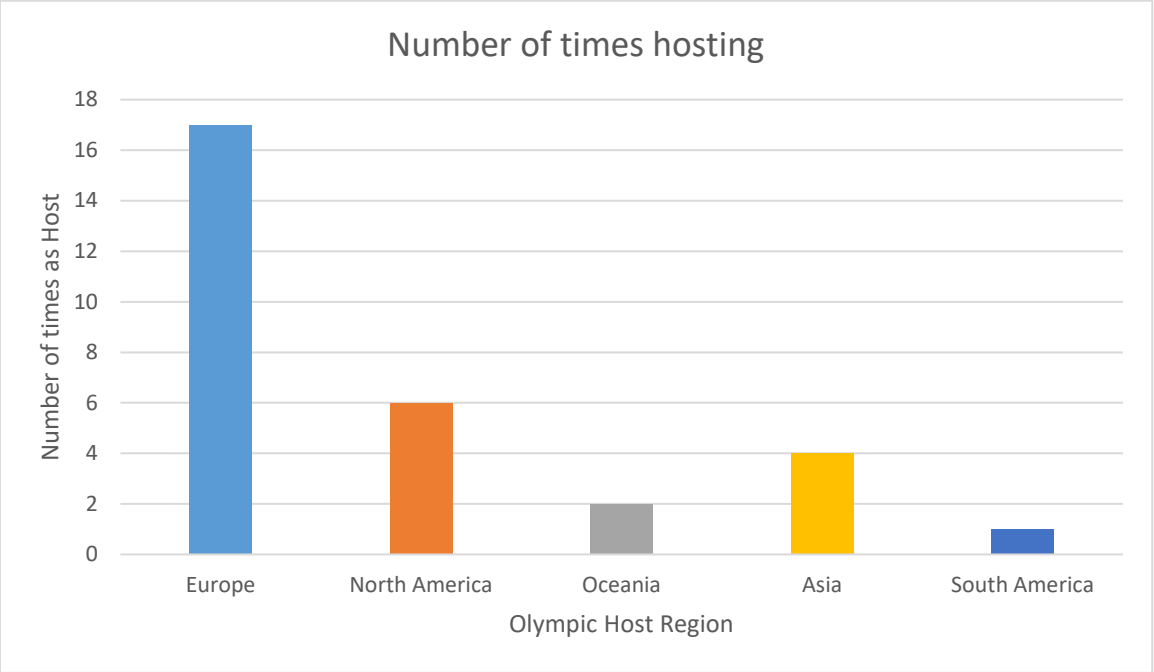


a) List the forms of transport represented in the pie graph in order from **most** to **least** popular.

b) Which would affect more people, an increase in the price of bus fares or an increase in the price of train tickets (for "JR" trains)?
Explain why.

Marking	
1 mark	Correctly answer for part a)
1 mark	Correct answer for part b)
1 mark	Correct reason for part b)

Use the graph below to answer questions 15 and 16



15) Host Regions (3 marks)

Which region has hosted the Olympic Games the most and which has hosted the least?

Provide possible reasons why these regions have hosted the most or the least number of Olympic Games.

Marking	
1 mark	Correctly identified host regions
2 marks	At least two correct reasons

16) Missing Host Region (2 marks)

Which global region has not hosted an Olympic Games? Explain why.
(hint: this region is not shown on the graph, you will need to work out what Global Olympic region is missing)

Marking	
1 mark	Correctly Identified region
1 mark	Correct reasoning

17) Design the Olympic Village (5 marks)

You are to design the layout of the Olympic Games Village. You must include sporting complexes that can accommodate each of the following sports *(note: each sport does not have to be in a separate complex eg Basketball and Netball may be in the same building):*

- Aquatics (Swimming and Diving)
- Athletics
- Badminton
- Basketball
- Boxing
- Cycling (Road, Mountain, BMX, and Track)
- Gymnastics (Artistic and Rhythmic)
- Hockey
- Lawn Bowls
- Netball
- Rugby 7s
- Shooting
- Squash
- Table Tennis
- Triathlon
- Weight lifting
- Wrestling

You should also include eating areas for spectators and athletes, footpaths, toilets and outdoor viewing areas with big screens.

Your village is to be displayed on one A4 page of grid paper or it can be designed using a computer program of your choice. All buildings must be clearly labelled, indicating each sports location. Ensure that your buildings are draw in proportion to their sizes *i.e. your toilets should not be the same size as the athletics stadium.*

Marking	
1 mark	All sports accommodated
1 mark	Additional facilities included
1 mark	Design is clear and easy to read
1 mark	Appropriate sports combined in buildings
1 mark	Appropriate proportions used

18) Staggered Start (5 marks)

Imagine you are building a new Olympic stadium and you are responsible for designing and marking out the running track. The track needs to fulfil the following specifications:

- The distance around the inside edge of the inner lane should be 400m.
- There should be 8 lanes.
- Each lane should be 1.25m wide.
- The track should consist of two straight sections joined by two semi-circular sections.
- The straight sections should each be 85m in length (a straight section is extended over the curve for the 100m race, as shown on the next page).

Draw your running track on an A4 piece of paper, ensuring that all required measurements are clearly indicated.

For the 200m race, runners start on the curved section at the right of the diagram and run anticlockwise to the finish line at the top left.
As the outer lanes are longer than the inner lanes, a staggered start is needed so that at the finish line all runners have run the same distance.

Can you work out where each runner should start so that they all run 200m in total? (Show all working out and calculations.) Mark these positions on your diagram

Marking	
1 mark	Diagram is neat and easy to read
1 mark	All appropriate measurements are shown on diagram
2 marks	Correct calculations for starting positions, including working
1 mark	Starting positions shown on diagram

Bodily/Kinesthetic

19) Olympic Measures (2 marks)

On the next page, there are some interesting measurements and records from events at the Olympic Games. Unfortunately, they have been muddled up. Can you cut out the cards and regroup them correctly? Cut them out and paste them, regrouped correctly, onto an A4 sheet of paper.

Marking	
1 mark	Worksheet has been cut out and regrouped with some correct answers
1 mark	Worksheet has been accurately regrouped

100 metres men's Olympic record	1.5	seconds
Mass of Women's Discus	1	metres
Women's Discus Olympic Record	76.80	centimetres
Olympic Record Men's 50 km Walking race	23.12	centimetres
Men's Shot put Olympic Record	3:32:33	kg
Women's Marathon Olympic Record	9.63	metres
Triathlon Swim (distance)	40	metres
Triathlon Bicycle ride (distance)	10	hr:min:sec
Triathlon Run (distance)	7.40	metres
Men's Pole Vault Olympic Record	6.03	metres
Women's Long Jump Olympic Record	2.45	metres
Men's High Jump Olympic Record	46	km
Basketball hoop diameter	305	km
Basketball hoop height	1.22	km
Diameter of Archery target	70	metres
Archers' distance from the target	10	hr:min:sec
Height of Diving platform	2:23:07	metres

20) Running Times (3 marks)

Year	Time
1972	11.07
1976	11.08
1980	11.06
1984	10.97
1988	10.54
1992	10.82
1996	10.94
2000	11.12
2004	10.93
2008	1078
2012	10.75
2016	10.71

The table above shows the last 12 Olympic Games Gold Medal women's times in the 100m running event. Draw a line graph to represent this information.

Marking	
1 mark	Appropriate scale on each axes (1/2 mark each)
1 mark	Appropriate heading and labelling of axes
1 mark	Accurate and Neat Graph

21) Survey (2 marks)

Conduct a survey of your classmates (or at least 20 other people) to determine the most popular Olympic Games event. Submit your recorded answers as a table or graph on a separate piece of paper.

Marking	
1 mark	A minimum of 20 people surveyed
1 mark	Clear and concise data collection as a table or graph

22) What can you achieve? (3 marks)

The Current Olympic 100m men's record is 9.58 seconds. What can you achieve in this time?

i. How far can you run?
ii. How many times can you catch a ball?
iii. How many times can you write your name?
iv. How long does it take you to run 100m?

Complete each of the above activities and record the information gathered in a table.

Marking	
½ mark each	Each correct answer
1 mark	Results displayed in a table

23) 200m event (4 marks)

Imagine that you raced in the 200m in the 2016 Olympic Games. Usain Bolt from Jamaica ran the final in 19.78 seconds. Time yourself running 200m, by what *distance* would he beat you?
(*hint: you will need to first determine your speed using the formula* $speed = \frac{distance}{time}$)

Marking	
1 mark	Student's running time given
1 mark	Correct calculation of student's speed
1 mark	Correct calculation of how far student has runs in 20.14s
1 mark	Correct calculation of the distance

24) Medals Count (3 marks)

Given the following clues, can you work out the number of gold, silver and bronze medals that Scotland, Wales and Australia have?

- Australia has 1 more gold medal, but 3 fewer silver medals, than Wales.
- Scotland has the most bronze medals (18), but fewest gold medals (7).
- Each country has at least 6 medals of each type.
- Wales has 27 medals in total.
- Wales has 2 more bronze medals than gold medals.
- The three countries have 38 bronze medals in total.
- Scotland has twice as many silver medals as Wales has gold medals.

Display your results in the table as below.

	Gold	Silver	Bronze	Total
Australia				
Scotland				
Wales				

Marking	
1 mark	Australian Medals correct
1 mark	Scotland Medals correct
1 mark	Wales Medals correct

Technology

25) Countries not in the Olympic Games (2 marks)

Since the last Olympics in Tokyo, in 1964, there have been a number of different countries that have not participated in the games for a variety of reasons. Pick two different Olympic Games since the last time the Olympics were in Tokyo and describe why two different countries did not participate in those games (it doesn't necessarily need to be from the same year/games). Make sure to include the year that the country did not participate.

Marking	
1 mark	First country, year and description of why that country did not participate
1 mark	Second country, year and description of why that country did not participate

26) Cost of Infrastructure (2 marks)

Research the cost of construction of the following Olympic venues:

- Oi Hockey Stadium
- Tokyo Aquatics Centre
- Ariake Arena
- Musashino Forest Sports Plaza
- New National Stadium

Marking	
1 mark	Cost for each building included
1 mark	Total cost calculated

27) Graphing costs (3 marks)

Using Microsoft Excel create a sector and column graph to display the information found in Question 26. You must ensure that you submit your excel file to your teacher, this may be in printed or electronic form.

Which graph is the best representation of the data? Why?

Marking	
1 mark	Sector graph created
1 mark	Colum graph created
1 mark	Selection of most appropriate graph and justification

28) Alternative Records (4 marks)

In the Olympic Games, medals are awarded for the best performances in each event.

Investigate and answer the questions below. Your answers must be based off Olympic Games events:

Name the sport in which:

a) A human travels the fastest?
b) An object travels the fastest?
c) An object travels the highest?
d) An object experiences the greatest forces, stresses or strains?

Marking	
1 mark	Part a correctly identified
1 mark	Part b correctly identified
1 mark	Part c correctly identified
1 mark	Part d correctly identified

29) Star Athlete (4 marks)

You are to superimpose a digital image of yourself onto a digital image of a sporting event. To do this you will need to:

- Select a sport that will feature in the Tokyo 2020 Olympic Games and find an image/s of this sport.
- Find a photo of yourself (you may choose to take a picture of yourself participating/posing in your chosen sport).
- Using a digital software tool (eg PowerPoint or Photoshop) edit the image of yourself in order to remove the background before superimposing yourself onto the digital image of your sporting event.

Submit an electronic copy of your file to your teacher.

Marking	
1 mark	Image includes photo/s of a sport included in the Olympic Games
1 mark	Image includes photo of the student
2 marks	Image is well edited and superimposed

30) Kahoot (3 marks)

Create a Kahoot with at least 10 questions based on The Olympic Games (venues, sports and interesting facts).

Ensure that you submit a link to your Kahoot with your assignment.

Marking	
1 mark	The Kahoot contains at least 10 questions.
1 mark	The questions are relevant to the Olympic Games
1 mark	Answers to the questions are correct

Overall marking comments