

ANDERSON SECONDARY SCHOOL
Preliminary Examinations 2025
Secondary Four Express



CANDIDATE NAME:

CLASS:

INDEX NUMBER:

GEOGRAPHY**2279/01**

Paper 1

26 August 2025**1 hour 45 minutes****0800 - 0945**

Additional Materials: Insert

MARK SCHEME

1	Cluster 1: Geography in Everyday Life	
	<p>A group of students from Horizon High School is interested to find out residents' perception of urban heat within a precinct. They want to investigate if the type of surface material influences the likelihood and frequency of residents spending time in various outdoor locations.</p> <p>They tested the hypothesis: 'Residents prefer to visit outdoor locations with natural surfaces than artificial ones due to lower perceived heat.'</p> <p>To prepare for their investigation, the students conducted a pilot survey on a Saturday afternoon. Fig. 1.1 shows an excerpt from their fieldwork journal that documents insights gained during the pilot survey.</p> <p style="text-align: center;">Excerpt from the students' fieldwork journal</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p>Date: 5 May 2025 Time: 2:00 PM - 4:00 PM Location: Ang Mo Kio Block 400s (near a small community garden) Sample size: 10 residents Notes: - Managed to find respondents quite easily. Many residents were reluctant to stop for long interviews due to the heat. Administered a short closed-ended questionnaire and attempted mental mapping. Some participants found it hard to draw detailed maps from scratch. Q5 was interpreted differently by different respondents.</p> </div> <p style="text-align: center;">Fig. 1.1</p>	
(a)	(i)	Suggest a measure that students could be implemented to mitigate a possible risk faced during their investigation. [2]
		<p>Award 1m for identification of possible risk. Award 1m for suggesting a reasonable measure to mitigate it.</p> <ul style="list-style-type: none"> • Risk: Heat stress / Dehydration / Sunburn [1] • Mitigation: Students should stay hydrated by drinking plenty of water/ wear light and loose clothing/ take frequent breaks in shaded areas/ schedule fieldwork during cooler periods of the day [1] <p>Accept all plausible answers. AO1</p>
	(ii)	Using Fig. 1.1, suggest why conducting a pilot survey is important. [2]
		<p>Award 1 mark for suggesting a benefit of pilot survey, up to 1m. Award 1 additional mark for a further elaboration, up to 1m.</p> <ul style="list-style-type: none"> • To identify potential problems/challenges with fieldwork methods to make changes/improve/refine [1]

	<ul style="list-style-type: none"> ○ E.g. After finding out that most respondents do not know how to draw maps from scratch, they can provide base maps for the actual investigation [1 additional mark] ● To assess feasibility of the investigation [1] <ul style="list-style-type: none"> ○ Whether or not the selected time, duration and venue is easy to find respondents if the timeframe [1 additional mark] <p>AO2</p>
(b)	The students decided to conduct a questionnaire to investigate their hypothesis near four different outdoor locations within the precinct: a playground with artificial turf, a community garden with natural soil, a basketball court with concrete surface, and a park lawn with grass.
(i)	Explain why convenience sampling may not be an appropriate choice of sampling method for their investigation. [4]
	<p>Award 1m for each explanation, up to 4m. Award max of 1m for further elaboration of each description, if applicable.</p> <ul style="list-style-type: none"> ● Convenience sampling is carried out in an ad hoc manner that is most accessible to the researcher. [1] ● Hence does not take into consideration factors like a person's sex, age and ethnicity that may influence data collected [1] <ul style="list-style-type: none"> ○ For instance, an active youth may be more likely to spend time at basketball court in spite of perceived higher heat. [1 additional mark] ● Does not create a representative sample with a proportional makeup of the whole population [1 additional mark] <ul style="list-style-type: none"> ○ Hence data collected may not be reliable [1 additional mark] <p>AO2</p>

(ii)

Study Tables 1.1 and 1.2, which shows information the students collected with the questionnaire.

Table 1.1

Information collected with the questionnaire

Q2: How likely are you to visit the following locations?

Area	Very Likely (%)	Likely (%)	Unlikely (%)	Very Unlikely (%)
Playground (Artificial Turf)	25	40	25	10
Community Garden (Natural Soil)	35	45	15	5
Basketball Court (Concrete)	20	30	30	20
Park Lawn (Grass)	40	35	15	10

Table 1.2

Q3: How frequent do you to visit the following locations?

Area	Daily (%)	3-4 Times a Week (%)	1-2 Times a Week (%)	Rarely/Never (%)
Playground (Artificial Turf)	10	25	35	30
Community Garden (Natural Soil)	15	35	30	20
Basketball Court (Concrete)	5	15	25	55
Park Lawn (Grass)	20	30	30	20

Results of the questionnaire

Using Tables 1.1 and 1.2, describe the relationship between the residents' likelihood and frequency of visits to the different locations. [3]

Award 1m for description of relationship, up to 2m.
Award 1m for elaboration of each relationship.

- There is no clear co-relation between likelihood and frequency of visits to the locations. [1]
- Out of 4 locations, only 2 showed strong alignment between likelihood and frequency of visits to the location. [1]
 - Park Lawn and Community Garden with highest % of likelihood of visiting (75% and 80% respectively) which corresponds to them having the highest frequency of visiting of 50% [1 additional mark]
- The other 2 locations showed that high likelihood of 50% and above of visiting did not translate into frequency of visits. [1]
 - E.g. especially for playground where there is a relatively high % of residents (65%) reporting likelihood of visit, yet half of that figure rarely/never ever visit. [1 additional mark]

OR

- There is generally a positive co-relation [1]
- Places where residents reported high likelihood of visits do correspond with places with high frequency of visits. [1]
 - Park Lawn and Community Garden with highest % of likelihood of visiting (75% and 80% respectively) which corresponds to them having the highest frequency of visiting of 50% [1 additional mark]
 - Likewise Basketball Court and Playground have comparatively lower % of likelihood of visiting which corresponds to the comparatively lower frequency. [1 additional mark]/specific e.g. such as there is high % of 50% of residents who mentioned they are not likely to visit Basketball court and that correspond to the high % of 80% residents who rarely or never visit it, or at most 1-2 times a week. [1 additional mark]
- There is generally a negative co-relation [1]
- Residents generally indicated a high likelihood to visit all locations, with more than 50% who indicated they will visit, but a vast majority would frequent them at most twice a week. [1]
 - For instance, for playground with a relatively high 65% who are likely or very likely to visit has about double of residents saying they will visit only at most twice a week [1 additional mark]
 - Even though half of the residents indicated likelihood to visit, more than thrice of them only visited at most twice a week [1 additional mark]
 - Despite community garden having the highest 80% likelihood, only half of the residents would visit frequently of at least thrice a week [1]

Also accepted: If students talk about the relationship between likelihood and frequency at natural vs artificial surfaces, cap at 1m at question is not asking for conclusion of likelihood and frequency across the different locations.

AO2

(iii)

Figs. 1.4 and 1.5 show bar graphs representing the results of the questionnaire from Tables 1.1 and 1.2.

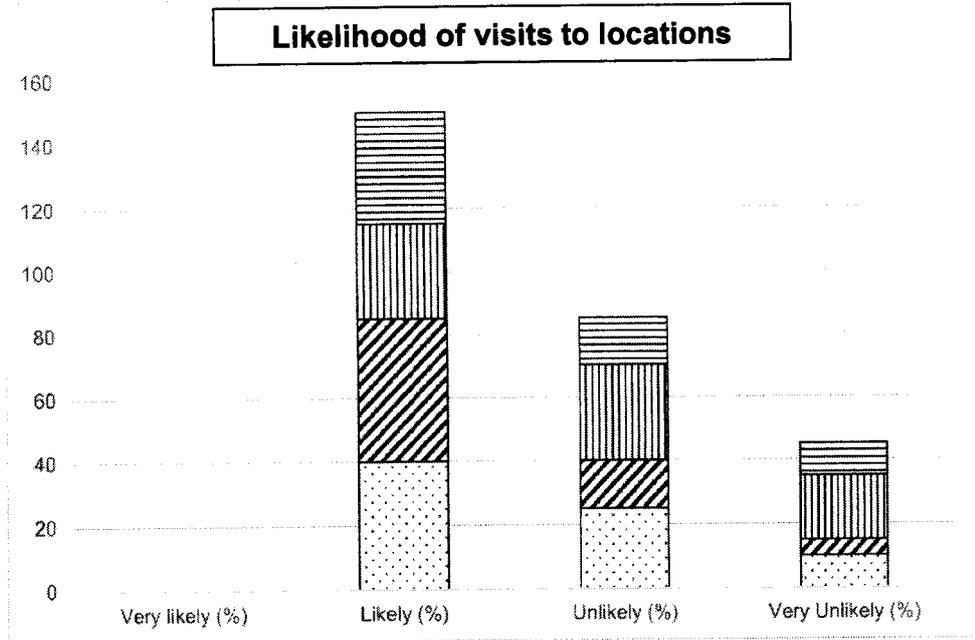


Fig. 1.4

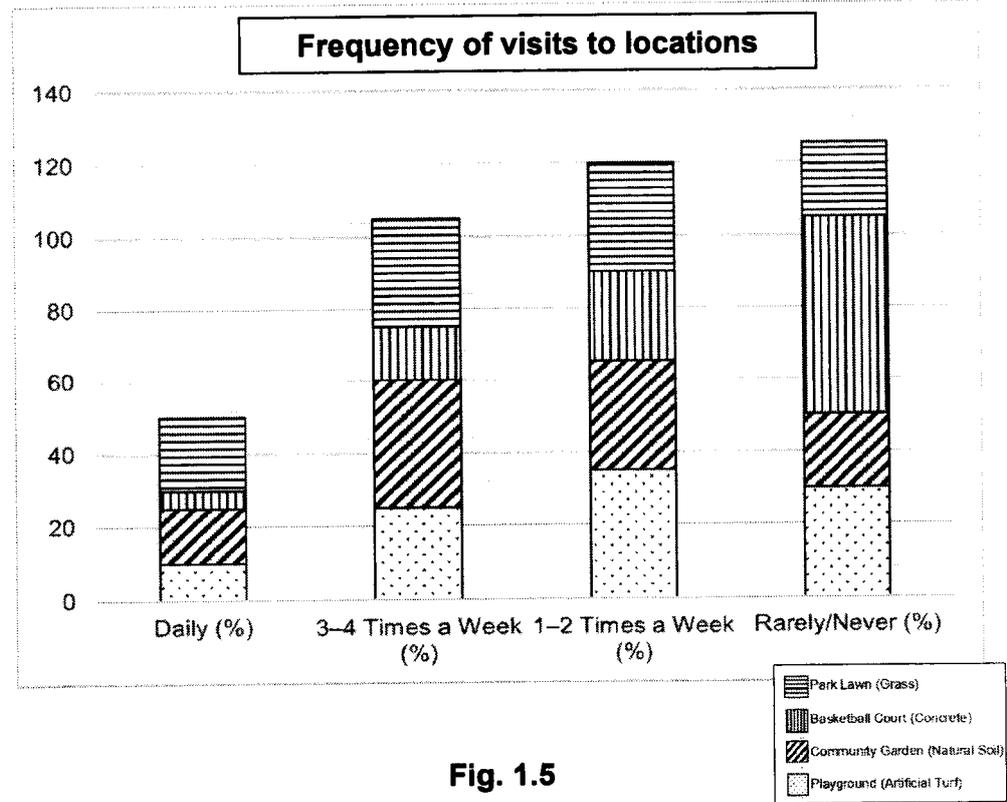


Fig. 1.5

Use information from Table 1.1 to complete the bar graph for the percentage of residents who are very likely to visit the four locations. [3]

	<p style="text-align: center;">Likelihood of visit to locations</p> <p>Award 3m for % plotted correctly for 4 locations. Award 2m for % plotted correctly for 3 locations. Award 1m for % plotted correctly for 2 locations.</p> <p>AO1</p>
<p>(iv)</p>	<p>Evaluate the usefulness of data collected in Tables 1.1 and 1.2 in helping students understand residents' preferences for visiting outdoor locations due to perceived heat. [6]</p>
	<p>Award 1m for each explanation of data is useful / not useful, up to 4m. Award 1m for further elaboration of each explanation. Award a maximum of 3m to explanation of data being either useful / not useful.</p> <p><u>Useful</u></p> <ul style="list-style-type: none"> • It provides quantitative data on the likelihood and frequency of visits to various outdoor locations [1] <ul style="list-style-type: none"> ○ Allows students to identify patterns and trends. [1 additional mark] ○ For example, the high likelihood and frequency of visits park lawn and community garden can help students identify preference to visit outdoor locations with natural surface areas [1 additional mark] • Strengthens validity of conclusion [1] <ul style="list-style-type: none"> ○ Having two data sets of likelihood and frequency of visits allows students to triangulate between residents' intention and behaviour [1 additional mark] ○ Allow students to draw conclusions from multiple sources of information [1 additional mark]

	<p><u>Not useful</u></p> <ul style="list-style-type: none">• Data lacks qualitative insights that could explain why residents prefer locations [1]<ul style="list-style-type: none">○ Prevents students from fully understanding the motivations of residents' behaviours [1 additional mark]/ cannot verify if residents' perception of heat in the locations is truly the deciding factor for their preferences. [1 additional mark]• Data lacks information on demographics, time of use for e.g. [1]<ul style="list-style-type: none">○ Which play crucial roles in influencing residents' preferences [1 additional mark] <p>AO3</p>
--	--

[Total: 20 marks]

2	Cluster 2: Tourism	
(a)	<p>Study Fig. 2.1, which shows an excerpt about tourism in Shikoku and Tohoku, Japan.</p> <p style="text-align: center;">Tourism in Shikoku and Tohoku, Japan</p> <div style="border: 1px solid black; padding: 10px;"> <p>In rural Shikoku, Japan, the government partnered with local communities to promote it as a 'slow travel' destination by restoring historical towns and promoting traditional crafts. Disused railway lines were transformed into heritage trails. Old merchant houses were converted into stylist guesthouses, cafes and art spaces, combining heritage with modern aesthetics.</p> <p>Street murals, creative workshops, and pop-up food events are regularly organised to provide interactive, Instagrammable experiences that blend culture and lifestyle. Digital marketing and influencer campaigns have been widely used to spotlight hidden gems, successfully drawing a younger, experience-seeking crowd.</p> </div> <p style="text-align: center;">Fig. 2.1</p>	
	(i)	Using Fig. 2.1, identify the stage in the evolution of a tourist destination that Japan is in. [1]
		<p>Rejuvenation [1]</p> <p>AO1</p>
	(ii)	Justify your answer in (a)(i) . [3]
		<p>Award 1m for each justification, up to 3m. Award 1m for elaboration of each justification.</p> <ul style="list-style-type: none"> • Efforts are being made to attract more tourists by revitalising and diversifying the tourism experience.[1] • There is rebranding of the traditional town to be appealing to the younger crowd [1] <ul style="list-style-type: none"> ○ Development of new experiences that cater to the interests of a younger crowd that may typically not be interested in traditional towns [1 additional mark] • There are innovative efforts to advertise the revamped destination through digital platforms and reposition the rural town in the tourism market [1] <p>AO2</p>
(b)	Describe a way tourism can impact a country's culture negatively. [2]	
	<p>Award 1m for description of how tourism can impact culture negatively. Award 1m for elaboration for each description.</p> <ul style="list-style-type: none"> • Tourists may behave in ways that locals find disrespectful, such as dressing inappropriately at religious sites. [1] <ul style="list-style-type: none"> ○ Over time, this can cause locals to develop negative attitudes towards tourists [1 additional mark] 	

○ and in some cases, tourists may even become victims of crime due to rising tensions. [1 additional mark]

OR

- Customs and art forms are modified or performed repeatedly to please tourists/traditional cultural practices may be commodified [1]
 - This can cause locals to lose a sense of belonging and identity, leading to feelings of disconnection or conflict within the community. [1 additional mark]

AO1

(c) Study Figs. 2.2 and 2.3, which shows information about sustainable tourism.

Community-based Tourism

Community - Based Tourism

CBT is a tourism management model that put local communities at the centre of the process.

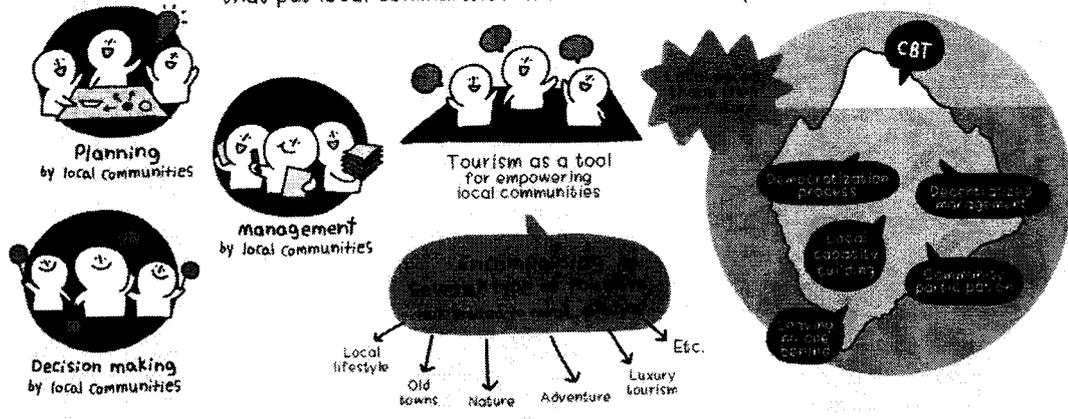


Fig. 2.2

Global ecotourism market

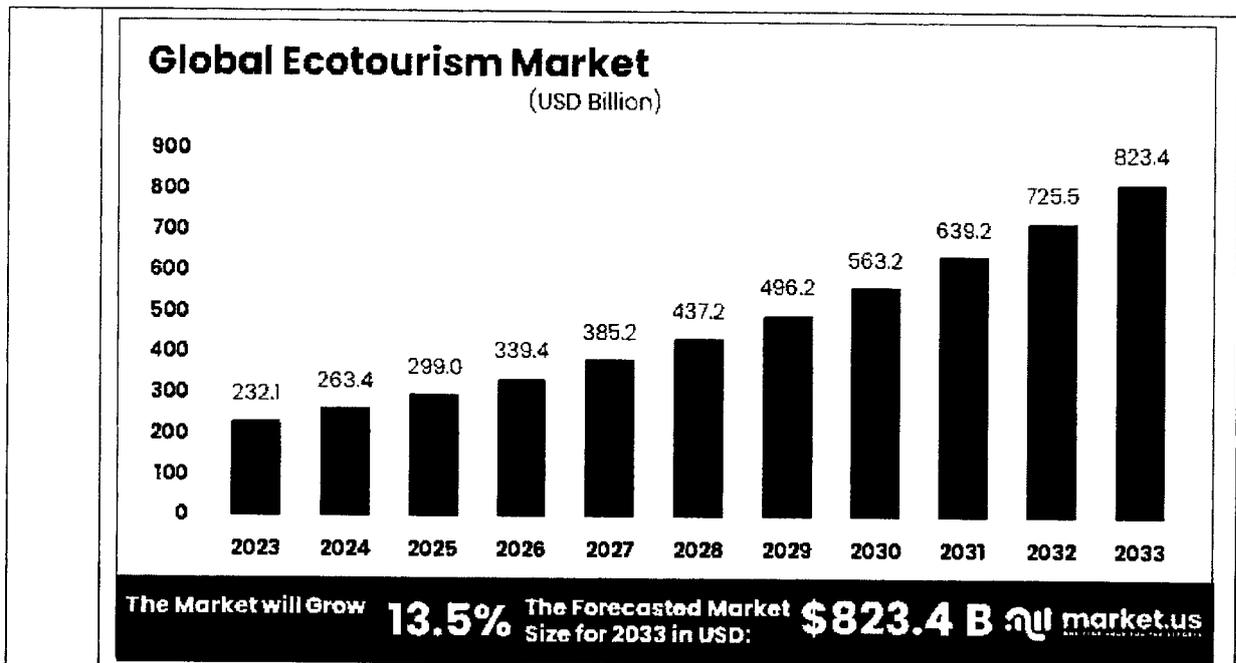


Fig. 2.3

'Community-based tourism is more effective than ecotourism in achieving sustainable tourism development.'

With reference to Figs. 2.2 and 2.3, to what extent do you consider this statement to be true? Explain your answer. [9]

Relevant content

Community-based tourism

- innovative small-scale tourism managed by local communities including homestays and agricultural tourism
 - Fig. 2.2: locals are involved in every step of the way, from planning to decision-making and management, emphasising local ownership.
 - Locals have good ground knowledge of the communities' economic, social and environmental needs and hence increased community participation can ensure that needs are met in a sustainable way.
 - Increased employment to locals → minimise leakages, ensures benefits of tourism remain within community, benefits locals directly (economic sustainability)
 - Fig. 2.2: Community-based tourism can come in the form of showcasing local lifestyle, old towns, nature etc. Educating/increasing tourists' appreciation of local cultures and environment help to develop respect for local cultures and environment. Locals are more inclined to implement sustainable practices that protect their environment, ensuring that tourism development does not compromise environment/heritage. (social, environmental sustainability)
- limitations include the potential loss of local culture and competition from larger-scale tourism operators
 - Possible loss of culture if locals offer tourism experiences to suit tourists' needs in order to attract them → commodification of culture

- Locals may lack the necessary skills and finances to further develop the local tourism industry e.g. language barrier, lack of skills/education to compete with large-scale tourism businesses.

Ecotourism

- Comprises diverse approaches that lie on a spectrum from hard to soft ecotourism
- Aims to conserve natural environment and benefit local communities → contributes to environmental, economic and social sustainability
 - Fig. 2.3: Growing ecotourism market. 4-fold increase within just 10 years meant generation of revenue to destination country and local communities. (economic sustainability)
 - High profitability encourages destination to protect and preserve natural habitats and environment, use resources sustainability. Entrance fees and tourist revenue help fund conservation. (environmental sustainability)
- Limitations include uncertainty over continuity of efforts in conserving nature and involving local communities
 - Uncertainty over continuity of efforts in conserving nature. Fig. 2.3 shows growing ecotourism market, which also reflects increasing volume of eco-tourists. Destinations may be overwhelmed by tourists.
 - High volume of tourists may destroy the environment they seek to protect.
 - May prioritise profits from ecotourism → some principles of ecotourism compromised
 - Uncertainty over involvement of local communities. High volume of tourists means high demand for manpower to cater to tourists' needs. Locals may not be sufficiently equipped with skills and knowledge, so businesses may hire non-locals instead.

A possible approach:

While CBT emphasises local ownership and cultural preservation, ecotourism similarly provides economic opportunities for local people through employment. Communities benefit financially, further encouraging their participation in conservation efforts. Furthermore, ecotourism projects often operate within formal conservation framework regulated by governments and international organisations. While ecotourism is growing, having regulatory oversight meant that tourism development is more likely to follow guidelines on carrying capacity limits, environmental standards, and community involvement policies. In contrast, community-based tourism initiatives being highly managed by locals may lack the resources or expertise to manage tourism sustainably, risking overexploitation or cultural commodification.

Level 3	7-9m	Develops arguments that support both sides of the discussion clearly, using a range of points with good elaboration. Examples used demonstrate a comprehensive understanding of the issue or phenomenon. Evaluation is derived from a well-reasoned consideration of the arguments .
------------	------	---

Level 2	4-6m	Develops arguments that support one side of the discussion well, using one or two points with some elaboration. Example(s) used demonstrate a good understanding of the issue or phenomenon. Evaluation is well supported by arguments.
Level 1	1-3m	Arguments are unclear with limited description or may be listed. No examples provided or examples are generic, demonstrating a basic understanding of the issue or phenomenon. Evaluation is simple, missing or unclear.
Level 0	0m	No creditworthy response.
AO3		

[Total: 15 marks]

3	Cluster 3: Climate
(a)	Explain how temperature varies with altitude. [4]
	<p>Award 1m for each explanation, up to 4m. Award 1m for elaboration of each explanation, if any.</p> <ul style="list-style-type: none"> • Incoming solar radiation reaches the Earth as shortwave radiation [1] • Earth's surface absorbs this shortwave radiation and re-radiates it as longwave radiation [1] • As the surface of the Earth warms up, it diffuses heat to the lower layers of the atmosphere first, followed by the upper layers.[1] • Hence, areas of higher altitudes will be cooler because less heat gets transferred upwards. [1] <p>OR</p> <ul style="list-style-type: none"> • Gravity pulls most of the air molecules towards the ground surface. [1] • Hence air at higher altitudes is thin and is unable to absorb heat as effectively as denser air at lower altitudes [1] • because it has a smaller concentration of vapour and gases to trap heat [1] • As a result, places of low altitude have higher temperatures [1] <p>AO1</p>
(b)	Study Figs. 3.1 and 3.2 (Insert), which show the distribution of average temperatures in January and July.
	With reference to Figs. 3.1 and 3.2, compare the average temperatures Tempin January and July. [4]
	<p>Award 1m for each comparison, up to 3m. Award 1m for elaboration of comparison.</p> <ul style="list-style-type: none"> • In both January and July, average temperatures are higher at lower latitudes. [1] <ul style="list-style-type: none"> ○ Temperatures generally decreased from about 25 degC to -30degC at the poles [1 additional mark] • Highest temperature of 30 -35 dc is experienced between 20 – 40 degree south and north in Jan and Jul respectively [1] • Temperatures in Northern hemisphere is lower in Jan than Jul [1] <ul style="list-style-type: none"> ○ Temperatures go to as low as -40dc at 80 degree north in Jan while lowest temperature in Jul is only 0dc. [1 additional mark] • Temperatures in Southern hemisphere is higher in Jan than Jul [1] <ul style="list-style-type: none"> ○ Lowest temperature at 80 degree south in Jan is 5dc while lowest temperature in Jul dips to -20dc. [1 additional mark] • Temperatures in January is generally similar at places with similar latitudes while there is greater fluctuation in July [1]

- In Jan, 25dc is generally experienced at 0 to 10 degree north and 0 to 30 degree south while in Jul it is experienced at 0 to 50 degree north and 0 to 20 degree south. [1 additional mark]

AO2

(c) Study Fig. 3.3, which shows a climate graph.

Climate graph

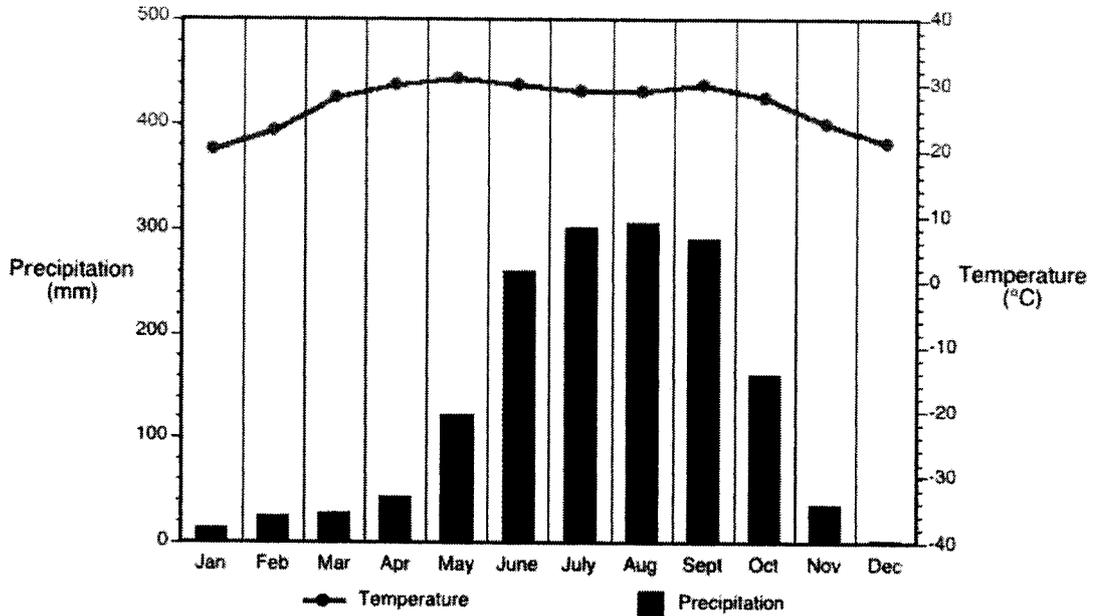


Fig. 3.3

Using Fig. 3.3, describe the climatic characteristics shown in the climate graph.[4]

Award 1m for each description, up to 3m.
Award 1 additional mark for elaboration of each description.

- It is a tropical monsoon climate [1]
- It has a small annual temperature range [1]
 - of 10 dc [1 additional mark]
- It has a high annual temperature [1]
 - of 29.2 dc. [1 additional mark]
- It has distinct wet and dry season [1]
 - With June – Sep being the wet months and Nov to Apr being dry [1 additional mark]

AO2

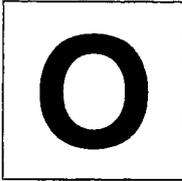
(d) The table below lists strategies used to build community’s resilience to climate change.

Table 3.1

Strategies to build community’s resilience to climate change

	<table border="1" data-bbox="427 226 1155 376"> <tr><td>Changes in consumption patterns</td></tr> <tr><td>Building sea walls</td></tr> <tr><td>Educating communities</td></tr> <tr><td>Low carbon technologies</td></tr> </table> <p>Identify a strategy from Table 3.1 for each category below. Each strategy should only be used once.</p> <p>Mitigation strategies:</p> <p>.....</p> <p>Adaptation strategies:</p> <p>.....</p> <p style="text-align: right;">[3]</p>	Changes in consumption patterns	Building sea walls	Educating communities	Low carbon technologies
Changes in consumption patterns					
Building sea walls					
Educating communities					
Low carbon technologies					
	<p>Award 3m for all strategies correctly identified. Award 2m for 3 strategies correctly identified. Award 1m for 1 or 2 strategies correctly identified.</p> <p>Mitigation strategies: Changes in consumption patterns, low carbon technologies</p> <p>Adaptation strategies: Educating communities, building sea walls</p> <p>AO1</p>				

[Total: 15 marks]



ANDERSON SECONDARY SCHOOL
Preliminary Examinations 2025
Secondary Four Express

CANDIDATE NAME: CLASS:

/

INDEX NUMBER:

GEOGRAPHY**2279/02**

Paper 2

01 September 2025**1 hour 45 minutes****0800 – 0945**

MARK SCHEME

Answer **all** questions.

1 Cluster 1: Geography in Everyday Life

(a)	Study Fig. 1.1 [Insert], which shows a map of existing and new developments in and around Bedok.
(i)	Using Fig 1.1, describe how spatial associations in the Bedok South neighbourhood can help enhance the everyday life of residents. [4]
	<p><i>Award 1 mark for description of each set spatial associations and enhancement, to a maximum of 2 marks.</i> <i>Award 1 additional mark for elaboration of each description.</i></p> <ul style="list-style-type: none"> • Integrated development + integrated transport hub [1m] <ul style="list-style-type: none"> ○ people can travel from other parts of Bedok South to access the services at the integrated devpt [1 additional mark] • School & housing precinct [1m] <ul style="list-style-type: none"> ○ within walking distance, can commute easily to & from school [1 additional mark] • Sports & recreation next to Bedok MRT and integrated transport hub [1m] <ul style="list-style-type: none"> ○ so people can go there easily for sporting events, grab a bite [1 additional mark] • CC & residential development [1m] <ul style="list-style-type: none"> ○ so people can gather at the CC for events, attend classes etc. (social gatherings also accepted) [1 additional mark] <p><i>Any other plausible answers accepted.</i></p> <p>AO2</p>
(ii)	With reference to Fig. 1.1, explain how the new developments can help the Bedok South neighbourhood achieve economic and social sustainability. [4]
	<p><i>Award 1 mark for each explanation of economic and social sustainability, to a maximum of 4 marks.</i> <i>Award 1 additional mark for elaboration of each explanation.</i></p> <p>Economic:</p> <ul style="list-style-type: none"> • School next to housing estate, reduce transport costs for students [1m] • Integrated transport hub means no need to build additional infrastructure to connect the transport modes [1m] • Integrated development can provide employment for residents, earn income & increase SoL [1m] <p>Social:</p> <ul style="list-style-type: none"> • Siglap CC provides shared community space for residents of Bedok South Horizon to have regular social interaction [1m]

	<ul style="list-style-type: none"> • New sports & recreation facility/more parks/Outdoor Play Corridor allows residents to gather for recreational activities [1m] <p><i>Note: question specifies new developments so existing developments are not accepted.</i></p> <p><i>Any other plausible answers accepted.</i></p> <p>AO2</p>
(b)	<p>Study Fig. 1.2, which shows a volunteer taking visitors on a tour of the Botanic Gardens in Singapore, and Fig. 1.3, which shows people tending to an edible garden at Jurong Lake Gardens.</p> <p style="text-align: center;">Volunteer taking visitors on a tour of the Botanic Gardens</p> <div data-bbox="424 712 1374 1346" data-label="Image"> </div> <p style="text-align: center;">Fig. 1.2</p> <p style="text-align: center;">People tending to an edible garden at Jurong Lake Gardens</p>



Fig. 1.3

With reference to Fig. 1.2 and 1.3, describe how urban parks in Singapore may provide ecosystem services to local communities. [3]

Award 1 mark for each description of ecosystem services, to a maximum of 3 marks.

Award a maximum of 1 additional mark for further development of each explanation, where applicable.

- **Provisioning** ecosystem services: **edible garden can provide food** [1m]
- **Regulating** ecosystem services: **trees lower surface & air temp, provide shade** [1m];
 - **regulate water flow so less flooding** [1 additional mark]
 - **improve air quality** [1 additional mark]
- **Cultural** ecosystem services: **improve mental & physical health** [1m]
 - **foster social belonging & group identity** [1 additional mark]
 - **space for educational opportunities** [1 additional mark]

AO1

- (c) Using an example, explain how the strengthening of relationships among residents can help to manage the risk of disasters in neighbourhoods. [4]

Award 1 mark for each point on how strengthening relationships can manage disaster risk, to a maximum of 4 marks.

Award a maximum of 1 additional mark for further development of each explanation, where applicable.

	<p><i>Reserve 1 mark for example.</i></p> <ul style="list-style-type: none"> • Disaster risk management plans in neighbourhoods may only be effective and sustainable if there is widespread support and long-term participation from the residents. [1m] • Strengthening relationships among residents is one such way of building community resilience so that they can resist, adapt to and recover from the impact of disasters. [1m] • Residents are encouraged to get to know their neighbours so that they can depend on one another during an emergency. [1m] • E.g. The People's Association (PA) builds community resilience by organising a wide range of community activities aimed at fostering positive relationships/ bringing people of different ages and backgrounds together. [1m] <ul style="list-style-type: none"> ○ The community's resilience was shown during the COVID-19 pandemic as residents came together to provide assistance to others in need (e.g. mask and food distribution). [1 additional mark] <p>AO1</p>
--	--

[Total: 15 marks]

2 Cluster 4: Tectonics

(a)	Study Fig. 2.1 [Insert], which is a map showing the epicentre of a 2016 earthquake off the coast of Sumatra, Indonesia.
(i)	With reference to Fig. 2.1, explain how the earthquake may have occurred. [4]
	<p><i>Award 1 mark for each point on the formation of the earthquake, to a maximum of 4m.</i></p> <p><i>Award a maximum of 1 additional mark for further development of each point, where applicable.</i></p> <ul style="list-style-type: none"> • The plate boundary between the Indo-Australian plate and the Eurasian plate contains systems of deep fractures called faults. [1m] • The earthquake may have occurred when rock masses on either side of a fault are pushed by the convergent tectonic forces, [1m] <ul style="list-style-type: none"> ○ due to the convergence of the Indo-Australian plate and the Eurasian plate [1 additional mark] • Friction causes them to get locked, and stress builds up. [1m] • When the stress exceeds the strength of the fault (or rock), the rocks snap/jerk/suddenly move to a new position. [1m] • This sudden movement causes seismic waves to be released, resulting in ground shaking/earthquakes. [1m]

	AO1
(ii)	<p>The earthquake, measuring 7.8M_w, struck on 2 March 2016 at 11.00pm. It was expected to affect places such as Padang (population 833,562) and Aceh (population 5.5 million).</p> <p>Using Fig. 2.1 and the given information, compare factors that may affect the disaster risks faced by places such as Padang & Aceh due to the earthquake. [5]</p>
	<p><i>Award 1 mark for each comparison, to a maximum of 5m. Award a maximum of 1 additional mark for further development of each point, where applicable.</i></p> <p>Similarities:</p> <ul style="list-style-type: none"> • Time of shaking - EQ struck at 11pm local time, when many people in both Padang and Aceh would be at home either asleep or getting ready for sleep [1m] <ul style="list-style-type: none"> ○ Hence would be less alert and unable to evacuate quickly [1 additional mark] ○ They would be likely to be trapped if buildings were to collapse, causing injuries and loss of lives [1 additional mark] • Exposure to tsunami hazard – both are located on the western coast of Sumatra, where the epicentre is located, therefore both places may experience tsunami triggered by the EQ [1m] <p>Differences:</p> <ul style="list-style-type: none"> • Distance from epicentre – Aceh is located farther from epicentre (>1000km) than Padang (about 700km) [1m] • Seismic waves will be weaker by the time they reach Aceh, compared to Padang [1m] <ul style="list-style-type: none"> ○ as more energy is absorbed by the rocks before the seismic waves reach Aceh [1 additional mark] ○ Buildings and bridges are less likely to collapse in Aceh due to the ground shaking [1 additional mark] • Population – Aceh has higher population of 5.5 million compared to Padang's lower population of 833,562. [1m] • Therefore there is a greater number of people and buildings exposed to hazards like ground shaking or tsunami [1m] <ul style="list-style-type: none"> ○ More people would be trapped if buildings were to collapse, causing more injuries and loss of lives <p>AO2</p>
(b)	<p>Study Fig. 2.2, which shows a volcano safety poster by the University of the West Indies Seismic Research Centre (UWI-SRC). The UWI-SRC monitors earthquakes, volcanoes and tsunamis in the English-speaking Eastern Caribbean.</p> <p style="text-align: center;">Volcano safety poster by the UWI-SRC</p>

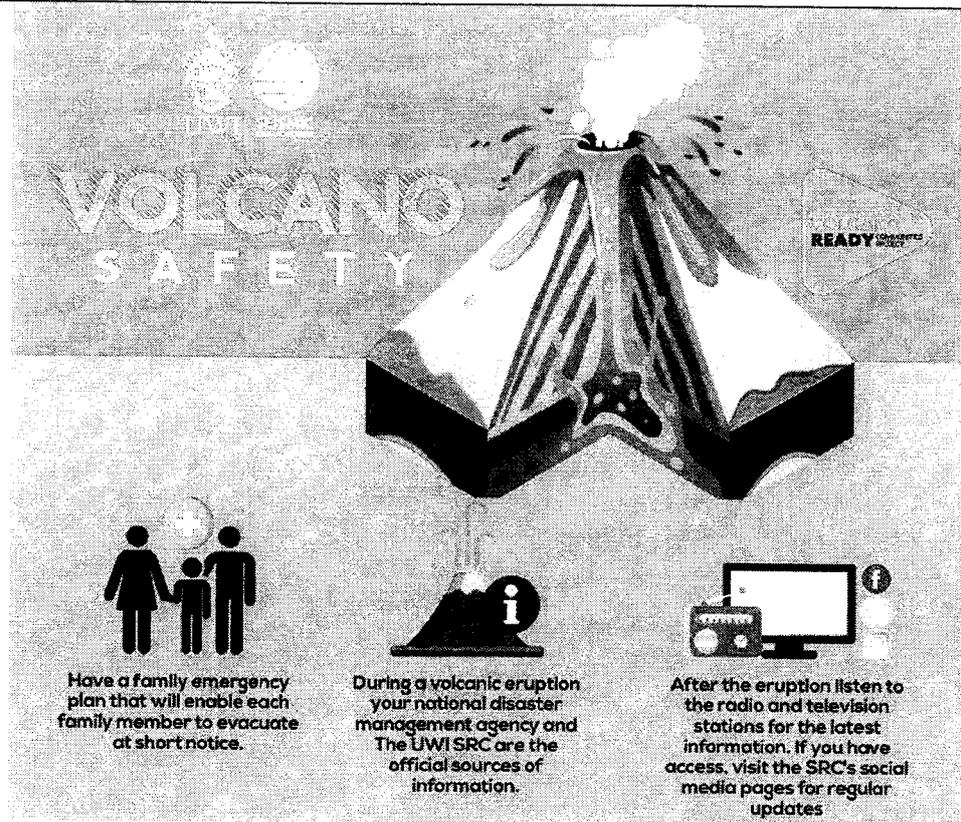


Fig. 2.2

With reference to Fig. 2.2, evaluate the disaster management strategies shown. [6]

Award 1 mark for each evaluation of the strategies, to a maximum of 6 marks. Award a maximum of 1 mark for further development of each evaluation, where applicable.

Reducing vulnerability through monitoring and warning systems:

- The UWI SRC uses **monitoring and warning systems** to detect seismic waves and ground deformation. [1m]
 - This data is used to **make predictions and send warnings** about potential hazards. [1 additional mark]
- The warnings **enable people to evacuate to a safer place, reducing their vulnerability** to volcanic hazards. [1m]
- However, the **lack of resources**, including **technological and financial** resources, may cause challenges in building community resilience in this way. [1m]
- The governments of developing countries such as those in the Eastern Caribbean may **choose to prioritise economic development** instead of investing in such systems. [1m]
 - Thus, it may **limit the ability of the UWI SRC to give accurate warnings** and allow people to evacuate in time. [1 additional mark]

Raising public awareness through education:

	<ul style="list-style-type: none"> • Posters such as the one shown provides people with the knowledge of how to respond to volcanic hazards, by ensuring that they have a family emergency plan for evacuation, and know which authorities to turn to for information and how. [1m] <ul style="list-style-type: none"> ○ This allows them to respond quickly and evacuate smoothly. [1 additional mark] • However, a lack of capability of the community to organise itself may limit the community's ability to respond to volcanic disasters [1m] <ul style="list-style-type: none"> ○ There could be a lack of effort to educate and train the community to respond, such as through regular evacuation drills. [1 additional mark] • Political instability, such as civil unrest, could limit how well families could form an evacuation plan. [1m] • Corruption could also lead to loss of funding meant to build community preparedness. [1m]
AO3	

[Total: 15]

3 Cluster 5: Singapore

(a)	Study Fig. 3.1 [Insert], which shows local production figures for selected food products, 2021-2023, and Fig. 3.2 [Insert], which shows information about Apollo Aquaculture's fish farms in Singapore and Brunei.
(i)	Describe the changes in food production from 2021 to 2023. [3]
	<p><i>Award 1 mark for each description, to a maximum of 3 marks. Award a maximum of 1 mark for further development of each description, where applicable.</i></p> <ul style="list-style-type: none"> • Overall: Production has decreased for all food products except for eggs which have increased [1m] <ul style="list-style-type: none"> ○ from total of 643.6 million in 2021 to 685 million in 2023 [1 additional mark] • Largest decrease in vegetable production which fell [1m] <ul style="list-style-type: none"> ○ from a total of 23.5 tonnes (or average 5.9 tonnes per quarter) in 2021 to 16.9 tonnes (or 4 tonnes per quarter) in 2023 [1 additional mark] • Slight decrease in seafood production which fell [1m] <ul style="list-style-type: none"> ○ from a total of 5.1 tonnes (1.23 tonnes per quarter) in 2021 to 4.1 tonnes (1 tonne per quarter) in 2023 [1 additional mark]
AO2	

(ii)	With reference to Fig. 3.1 and Fig. 3.2, explain how Singapore builds resilience in food security. [4]
	<p><i>Award 1 mark for each explanation, to a maximum of 3 marks. Award a maximum of 1 mark for further development of each explanation, where applicable.</i></p> <ul style="list-style-type: none"> • When there are disruptions in regional and global food supplies, local produce can serve as a critical supply source [1m] <ul style="list-style-type: none"> ○ E.g. increase in local egg production means that Singapore can rely on local eggs during times of disruption in external egg supply [1 additional mark] • This can be achieved through innovation in local farming [1m] <ul style="list-style-type: none"> ○ E.g. Apollo Aquaculture's high-tech, 3-storey fish farm allows farming to take place in smaller areas to overcome land constraints [1 additional mark] • Singapore supports local companies to expand overseas so that they can overcome land, water and manpower constraints in Singapore [1m] <ul style="list-style-type: none"> ○ E.g. Apollo Aquaculture is building a fish farm in Brunei, to rear fish which then can be imported back to Singapore [1 additional mark] <p><i>Any other plausible answers accepted.</i></p> <p>AO2</p>
(b)	Describe two challenges to Singapore that may arise from climate change. [4]
	<p><i>Award 1 mark for each description, to a maximum of 2m. Award a maximum of 1 additional mark for further development of each description, where applicable.</i></p> <p>Any 2 of the following:</p> <ul style="list-style-type: none"> • Floods: Singapore's drainage system may not be able to cope with the more intense rainfall that arises due to climate change [1m]. <ul style="list-style-type: none"> ○ Flash floods could cause more severe damage as there is very little response time [1 additional mark] • Urban heat island effect: Climate change can worsen the UHI effect as more heat can be retained by urban surfaces [1m]. <ul style="list-style-type: none"> ○ Additionally, the use of air conditioning, cars and factories emit heat and raise the surface temperature. [1 additional mark] ○ Higher humidity levels also worsen the situation as sweat cannot evaporate easily, making us more vulnerable to heat exhaustion and heat stroke [1 additional mark] • Vector-borne diseases: Higher temperatures can cause cases of vector-borne disease to increase [1m] <ul style="list-style-type: none"> ○ E.g. warmer temperatures could shorten egg incubation of Aedes mosquito, resulting in a larger mosquito population and more cases of dengue [1 additional mark] • Threat to biodiversity: warmer temperatures can reduce biodiversity in Singapore as habitats can be harmed by warmer and drier conditions [1m]

	<ul style="list-style-type: none"> ○ E.g. increase in sea temperatures in 2010 led to a loss of 10% of Singapore's coral reefs [1 additional mark] • Water insecurity: due to Singapore's lack of water sources, extended periods of drought across the world can affect the reliability of Singapore's water supply [1m] <ul style="list-style-type: none"> ○ E.g. in 2016 and 2019, water levels fell in Johor's Linggiu Reservoir due to climate change, affecting Singapore's water supply [1 additional mark]
(c)	<p>Study Fig. 3.3 [Insert], an infographic about Singapore Changi Airport's proposed Terminal 5, and Fig. 3.4 [Insert], which shows annual international tourist arrivals in Singapore, 2014-2024.</p> <p>With reference to Fig. 3.3 and Fig 3.4, to what extent may Singapore's efforts to overcome the challenges of tourism development be considered sustainable? Explain your answer.</p>
	<p>Define Singapore's efforts to overcome challenges: opportunities to mitigate and adapt</p> <ul style="list-style-type: none"> • Challenges: global uncertainty (Covid-19's impact on tourist arrivals from 2020 onwards), regional competition (more price-competitive neighbours), discerning visitors (who are looking for individualised experiences), ageing population (manpower constraints & reliance on foreign workers), resource constraints (land for further development of infrastructure like T5) • Efforts to mitigate & adapt: benefits from regional growth (strongest growth for air travel in Asia-Pacific), partnership with stakeholders, trailing sustainability solutions, developing skilled workers <p>Evaluation: Scale - space limits scale of development? Timescale - Aging pop limits long term growth due to lack of manpower? Or perhaps with good governance/commitment, can continue to be sustainable & reap benefits (see: Singapore's considerations for sustainable development)</p> <p>AO3</p>

Generic level descriptors for 9m AO3 questions		
Level	Marks	Descriptors
3	7-9	Develops arguments that support both sides of the discussion clearly, using a range of points with good elaboration . Examples used demonstrate a comprehensive understanding of the issue or phenomenon. Evaluation is derived from a well-reasoned consideration of the arguments.
2	4-6	Develops arguments that support one side of the discussion well , using one or two points with some elaboration . Example(s) used demonstrate a good understanding of the issue or phenomenon. Evaluation is well supported by arguments.
1	1-3	Arguments are unclear with limited description or may be listed. No examples provided or examples are generic , demonstrating a basic understanding of the issue or phenomenon. Evaluation is simple, missing or unclear .
0	0	No creditworthy response.

[Total: 20 marks]

Acknowledgements:

Adapted from <https://www.ura.gov.sg/-/media/Corporate/Planning/DMP19/Regional-Resources/East-Flyers/Bedok.pdf>

<https://www.nparks.gov.sg/images/default-source/events/sbg/sbg-edu/june-2024/june-prog-photo.jpg>

<https://www.nparks.gov.sg/get-involved/volunteer/volunteer-with-us>

Adapted from <https://www.scmp.com/news/asia/article/1919972/indonesia-issues-tsunami-warning-after-massive-79-magnitude-quake-sumatra>

Adapted from <https://www.instagram.com/uwiseismic/p/C64002thpMB/>

Adapted from <https://www.sfa.gov.sg/docs/default-source/publication/sg-food-statistics/singapore-food-statistics-2023.pdf>

Adapted from https://static1.straitstimes.com.sg/s3fs-public/attachments/2017/02/14/ST_20170214_APOLLO14A_2939849.pdf

Adapted from <https://www.businesstimes.com.sg/singapore/singapore-airlines-operate-out-changi-airports-terminal-5-internal-train-cover-2-km-distance> and https://www.instagram.com/p/DJoQT4fSboW/?img_index=2

<https://roadgenius.com/statistics/tourism/singapore/>

