



South Australian
Certificate of Education

General Mathematics 2024

Question booklet

- Questions 1 to 8 (90 marks)
- Answer **all** questions
- Write your answers in this question booklet
- You may write on pages 13 and 24 if you need more space

Examination information

Materials

- Question booklet
- SACE registration number label

Instructions

- Show appropriate working and steps of logic in this question booklet
- Use black or blue pen
- You may use a sharp dark pencil for diagrams and graphical representations
- Approved calculators may be used — complete the box below

Total time: 130 minutes

Total marks: 90

© SACE Board of South Australia 2024

The SACE Board of South Australia acknowledges that this examination was created on Kaurna Land. We acknowledge First Nations Elders, parents, families, and communities as the first educators of their children, and we recognise and value the cultures and strengths that First Nations students bring to the classroom. We respect the unique connection and relationship that First Nations peoples have to Country, and their ever-enduring cultural heritage.

Attach your SACE registration number label here

Graphics calculator

1. Brand _____

Model _____

2. Brand _____

Model _____



Government
of South Australia

SACE
BOARD
OF SOUTH
AUSTRALIA

The manager would like to launch a new advertising campaign that guarantees 'to groom a dog in under two hours, or the next groom is free'.

The manager wants to investigate if allocating more than one job to Gracie would allow them to use this campaign.

Table 3 below shows the average time spent (in minutes) by each staff member to complete each task, with an additional row when Gracie is allocated one more job.

Table 3

	<i>Wash</i>	<i>Trim</i>	<i>Dry and Brush</i>	<i>Nails and Teeth</i>
Delilah	33	40	36	18
Owen	33	50	25	27
Gracie	32	53	40	22
Gracie	32	53	40	22
Zephyr	35	50	26	30

A new array to represent this new information from Table 3 is shown below.

33	40	36	18	0
33	50	25	27	0
32	53	40	22	0
32	53	40	22	0
35	50	26	30	0

(c) State why the new array must have an additional column of zeros.

(1 mark)

After completion of the first two steps of the Hungarian algorithm, the following array is achieved:

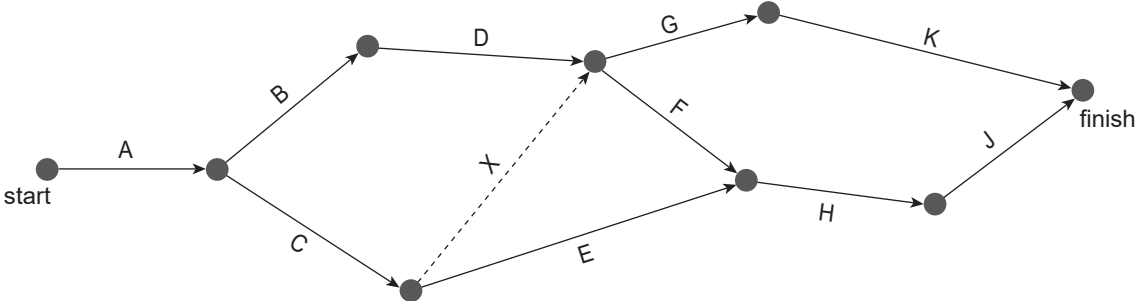
2	0	11	0	1
2	10	0	9	1
0	12	14	3	0
0	12	14	3	0
3	9	0	11	0

(d) Draw lines on the array above to show that the optimal solution has **not yet been achieved**.

(1 mark)

Question 3 (8 marks)

Peta is considering selling her house and moving to a larger home to accommodate her growing family. The network diagram below shows a series of tasks that need to be completed for this to happen.



(a) Explain why the dummy link marked X is required in the network diagram.

(2 marks)

The following precedence table has been completed for the above network diagram:

Table 4

<i>Task</i>	<i>Prerequisite task/s</i>	<i>Time to complete (days)</i>	<i>EST (days)</i>	<i>LST (days)</i>
A	-	5	0	0
B	A	1	5	7
C	A	4	5	5
D	B	2	6	8
E	C	2	9	9
F	C, D	1	9	10
G	C, D	2	9	12
H	E, F	3	11	11
J	G, H	3	14	14
K	G	2	11	15

(b) The network diagram shown above should contain two dummy links.

Using the information from the precedence table, draw the second dummy link on the network diagram above.

(2 marks)

You may write on this page if you need more space to finish your answers. Make sure to label each answer carefully (e.g. 4(b)(ii) continued).



Question 7 (10 marks)

A study was conducted to investigate whether there is a relationship between public health expenditure of a country and the happiness of its citizens.

The data was measured as:

- Public Health Expenditure (P): the amount of money the country spent as a percentage of their gross domestic product (GDP).
- Happiness Index (H): a score out of 10 measuring general life satisfaction and happiness of the country's citizens.

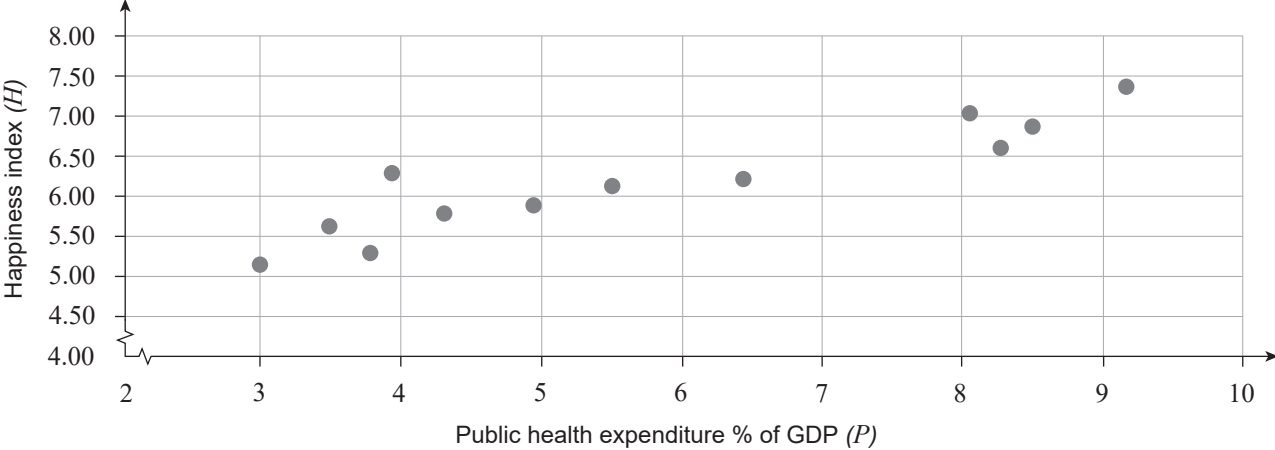
The data for a group of randomly selected countries is shown below in Table 9.

This table has been removed for copyright reasons.

Source: adapted from 'World happiness report 2024', University of Oxford, Wellbeing Research Centre, viewed 25 July 2024, worldhappiness.report/data/; 'Healthcare spending', viewed 25 July 2024, ourworldindata.org

A scatterplot displaying the data is shown below.

Happiness index v. Public health expenditure % of GDP



You may write on this page if you need more space to finish your answers. Make sure to label each answer carefully (e.g. 6(b)(ii) continued).

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for writing answers. The grid is empty.