



South Australian  
Certificate of Education

# General Mathematics

## 2019

### Question booklet

- Questions 1 to 9
- Answer **all** questions
- Write your answers in this question booklet
- You may write on page 23 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

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Attach your SACE registration number label here

#### Graphics calculator

1. Brand \_\_\_\_\_

Model \_\_\_\_\_

2. Brand \_\_\_\_\_

Model \_\_\_\_\_



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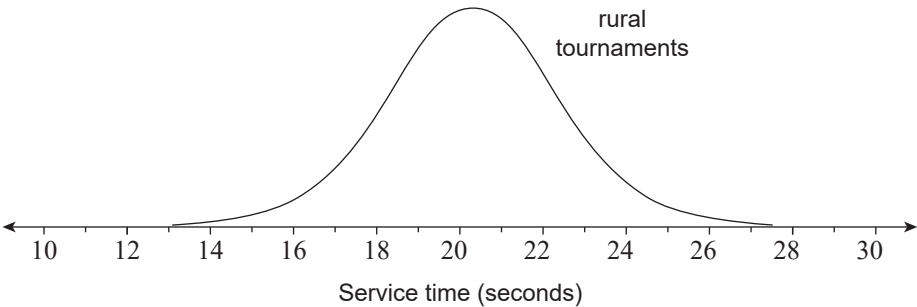








The graph below shows the probability distribution of service times recorded at rural tournaments.



(d) At the state tennis championship, the service time was found to be normally distributed with a mean of 18.5 seconds and a standard deviation of 1.5 seconds.

On the graph above, sketch the probability distribution graph for this state tennis championship.

(3 marks)







- (d) Lewis decides that he needs the pool installed as soon as possible and will take out a 3-year loan for the \$32 000. He considers the following two options:
- Option A charges 7.2% per annum, compounded weekly, with no establishment fees and no ongoing weekly charge.
  - Option B charges 5.39% per annum, compounded weekly, with a \$495 establishment fee and an ongoing charge of \$5 per week.

(i) Find the comparison rate for Option A and for Option B.



(4 marks)

(ii) Hence complete the following statement:

Lewis should select Option \_\_\_\_\_ because \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

**Question 7** (12 marks)

The following table shows the number of subscribers (in millions) to a worldwide video streaming service, Netflix, since it started at the beginning of 2007.

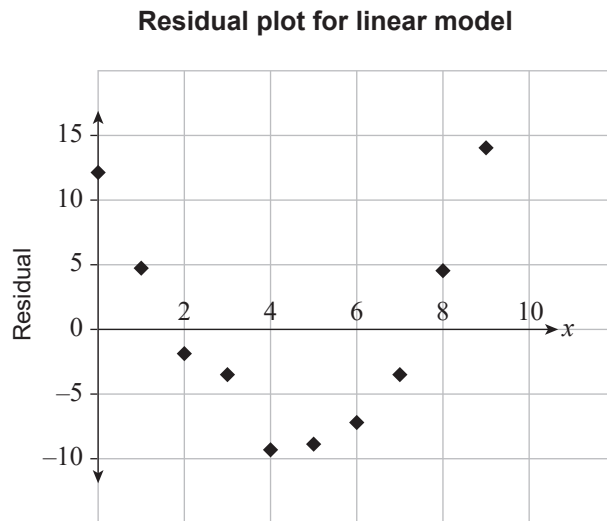
Number of years since the beginning of 2007 ( $x$ )	0	1	2	3	4	5	6	7	8	9
Millions of subscribers ( $y$ )	7.5	9.4	12.3	20.0	23.5	33.3	44.4	57.4	74.8	93.8

Source: adapted from a diagram in Richter, F 2017, 'Netflix's subscriber growth', Statista, viewed 4 July 2019, www.statista.com; data: Netflix

The linear regression equation for the Netflix data in the table is  $y = 9.35x - 4.44$ .

- (a) Complete the table of residuals below for this linear model. Give your answer correct to two decimal places. (1 mark)

$x$	Residual
0	11.94
1	4.49
2	-1.96
3	-3.61
4	-9.46
5	-9.02
6	-7.27
7	
8	4.43
9	14.08



- (b) (i) Complete the table below for the Netflix data.

Model	Regression equation	$r^2$
Linear ( $y = ax + b$ )	$y = 9.35x - 4.44$	0.919
Exponential ( $y = a \times b^x$ )		

(2 marks)











Some of the steps of the Hungarian algorithm have been applied to the array for Scenario 2, and the result is shown below.

0	0	7	3	7
6	6	5	0	0
9	9	13	0	3
5	6	4	3	0
0	0	0	0	1

(d) (i) Draw lines on the reduced array above to show that the optimal solution has not yet been reached. (1 mark)

(ii) Use the reduced array above to complete the application of the Hungarian algorithm.

(2 marks)

(iii) Give a complete interpretation of the optimal solution(s) in the context of the question.

(3 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. 6(c)(i) continued).







## GENERAL MATHEMATICS 2019

### ACKNOWLEDGMENT

Question 2: table: Based on AIHW 2018, Deaths web report: supplementary tables, Australian Institute of Health & Welfare; Registries of Births, Deaths and Marriages; National Coronial Information System; and Australian Bureau of Statistics, Canberra, Table S6.1

Question 7: table: Adapted from a diagram in Richter, F 2017, 'Netflix's subscriber growth: Netflix on the brink of a major milestone', *Statista*, viewed 4 July 2019, [www.statista.com](http://www.statista.com); Data: Netflix

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