



CATHOLIC SECONDARY SCHOOLS
ASSOCIATION OF NEW SOUTH WALES

--	--	--	--	--	--

Centre Number

--	--	--	--	--	--	--	--	--	--

Student Number

2007
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

General Mathematics

Morning Session
Monday 6 August 2007

General Instructions

- Reading time – 5 minutes
- Working time – 2½ hours
- Write using blue or black pen
- Calculators may be used
- Use Multiple Choice Answer Sheet provided
- A separate Formula Sheet is provided
- Write your Centre Number and Student Number at the top of this page

Total marks – 100

Section I Pages 2–9

22 marks

- Attempt Questions 1–22
- Allow about 30 minutes for this section

Section II Pages 10–20

78 marks

- Attempt Questions 23–28
- Allow about 2 hours for this section

Disclaimer

Every effort has been made to prepare these 'Trial' Higher School Certificate Examinations in accordance with the Board of Studies documents, *Principles for Setting HSC Examinations in a Standards-Referenced Framework* (BOS Bulletin, Vol 8, No 9, Nov/Dec 1999), and *Principles for Developing Marking Guidelines Examinations in a Standards Referenced Framework* (BOS Bulletin, Vol 9, No 3, May 2000). No guarantee or warranty is made or implied that the 'Trial' Examination papers mirror in every respect the actual HSC Examination question paper in any or all courses to be examined. These papers do not constitute 'advice' nor can they be construed as authoritative interpretations of Board of Studies intentions. The CSSA accepts no liability for any reliance, use or purpose related to these 'Trial' question papers. Advice on HSC examination issues is only to be obtained from the NSW Board of Studies.

3001-1

Section I

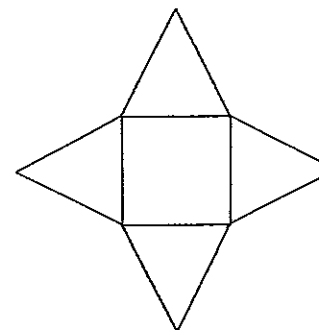
22 marks

Attempt Questions 1–22

Allow about 30 minutes for this section

Use the multiple-choice answer sheet.

1



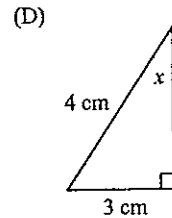
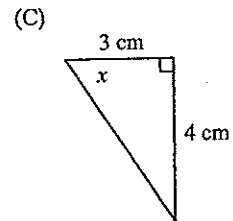
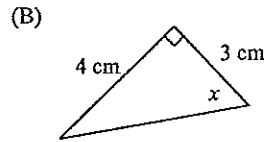
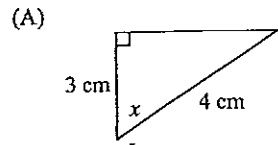
The diagram above is a net of:

- (A) a square pyramid
- (B) a square prism
- (C) a triangular pyramid
- (D) a triangular prism

2 Which of the following values can **not** be used to represent the probability of an event?

- (A) 0
- (B) 110%
- (C) $\frac{1}{200}$
- (D) 0.25

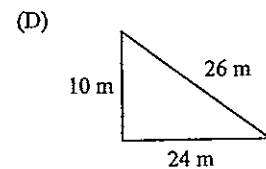
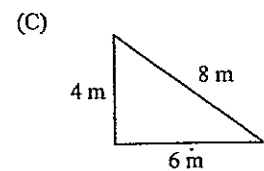
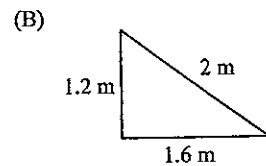
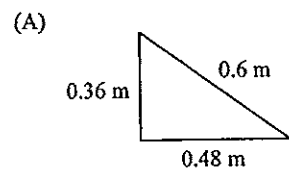
3 In which triangle below is $\sin x = \frac{3}{4}$?



4 Which of the following is an example of discrete data?

- (A) the type of car that is in your garage
- (B) the number of cars in your garage
- (C) the distance travelled by the cars in a month
- (D) the cost of petrol for the cars per month

5 Which of the following is **not** a right-angled triangle?



6 Expand and simplify: $7 - 3(5x + 2)$

- (A) $1 - 15x$
- (B) $9 - 15x$
- (C) $20x + 2$
- (D) $20x + 8$

7 Nathalie works a 38 hour week. She is paid an hourly rate of \$19.90. When she takes her four weeks annual leave she is paid a holiday loading of $17\frac{1}{2}\%$. Nathalie's weekly income when she takes her holiday leave will be:

- (A) \$132.34
- (B) \$756.20
- (C) \$888.54
- (D) \$3554.14

8 In a HSC Mathematics assessment task, the mean was 64 with a standard deviation of 8. A student recorded a z-score of 1.5 in the assessment task. The student's mark was:

- (A) 48
- (B) 72
- (C) 73.5
- (D) 76

9 Brandon has a credit card with a simple interest rate of 0.04% per day and no interest free period. He makes a purchase of \$280. After 23 days, the total amount payable, including interest, is:

- (A) \$2.58
- (B) \$257.60
- (C) \$280.01
- (D) \$282.58

10 Given that $v^2 = u^2 + 2as$, then the value of v when $u = 3.2 \times 10^7$, $a = 9.8$ and $s = 1.9 \times 10^8$ is closest to:

- (A) 1.9×10^4
- (B) 3.7×10^4
- (C) 3.7×10^8
- (D) 1.4×10^9

11 SJOGU Credit Union has the following monthly loan repayment table for each \$1000 borrowed.

Monthly Repayment on a Loan of \$1000

Interest Rate (% p.a.)	Period of Loan			
	6 years	8 years	10 years	12 years
7	\$17.05	\$13.63	\$11.61	\$10.28
8	\$17.53	\$14.14	\$12.13	\$10.82
9	\$18.03	\$14.65	\$12.67	\$11.38
10	\$18.53	\$15.17	\$13.22	\$11.95

Brittany wants to borrow \$165 000 to buy a unit in Culburra. She will repay the loan over a period of 10 years at an interest rate of 8% p.a. Using the loan repayment table above, Brittany's monthly repayment will be:

- (A) \$12.13
- (B) \$15.17
- (C) \$2001.45
- (D) \$2503.05

12 The city of Rawalpindi has position co-ordinates of (33°N, 73°E). The town of Zioge is 2 hours ahead of Rawalpindi. The position co-ordinates of Zioge are:

- (A) (3°N, 73°E)
- (B) (33°N, 43°E)
- (C) (33°N, 103°E)
- (D) (63°N, 73°E)

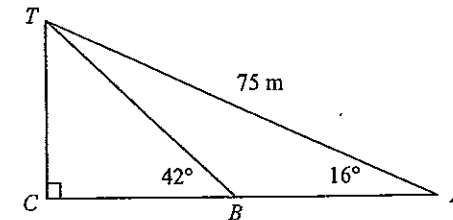
13 The intensity (I) of light at a certain point varies inversely as the square of the distance (d) of that point from the source of the light. The equation to show this relationship is:

- (A) $I = \frac{k}{d^2}$
- (B) $I^2 = \frac{k}{d}$
- (C) $I = kd^2$
- (D) $I^2 = kd$

14 In a class test, one student scored 16% and the remainder of the class scored above 50%. The measure which is most affected by the outlying score is:

- (A) mode
- (B) median
- (C) interquartile range
- (D) standard deviation

15



The formula which would be most useful in calculating the length of the side BT in the diagram above is:

- (A) $c^2 = a^2 + b^2$
- (B) $A = \frac{1}{2}ab \sin C$
- (C) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
- (D) $c^2 = a^2 + b^2 - 2ab \cos C$

- 16 There are 7 people on standby for a flight to Byron Bay. An hour before departure, 4 seats become available. The number of ways in which 4 people can be chosen to fill the seats is:

- (A) 14
 (B) 28
 (C) 35
 (D) 840

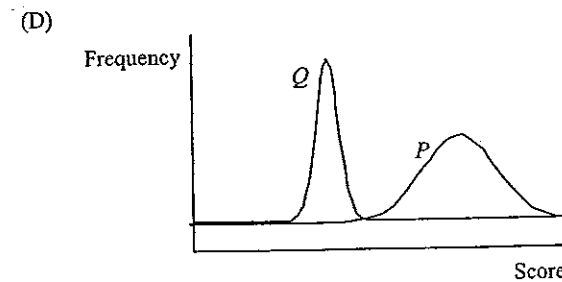
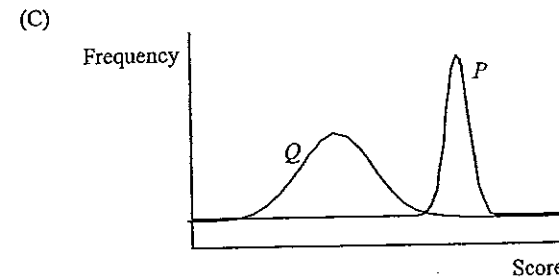
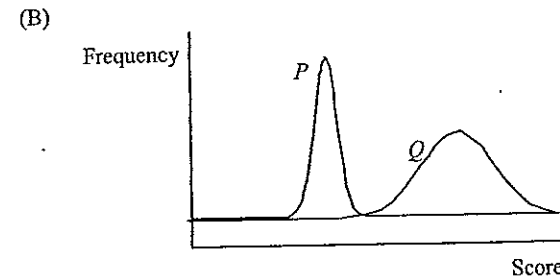
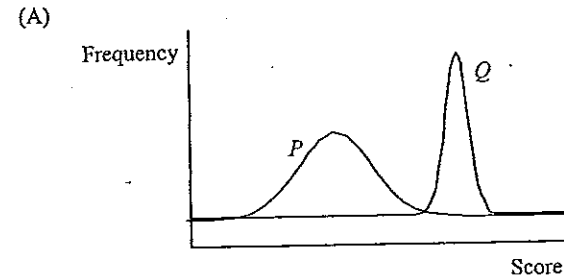
- 17 In the formula $s = ut + \frac{1}{2}at^2$, the value of a is given by:

- (A) $a = \frac{2(s - ut)}{t^2}$
 (B) $a = \frac{2(s - u)}{t}$
 (C) $a = \frac{s - ut}{2t^2}$
 (D) $a = \frac{\sqrt{2(s - ut)}}{t}$

- 18 \$3040 is invested at the end of every 6 months for 9 years at 3% p.a. with interest compounded half-yearly. Which of the following expressions will give the future value of the investment after 9 years?

- (A) $3040 \left[\frac{(1 + 0.03)^9 - 1}{0.03} \right]$
 (B) $3040 \left[\frac{(1 + 0.015)^{18} - 1}{0.015} \right]$
 (C) $3040 \left[\frac{(1 + 0.03)^9 - 1}{0.03(1 + 0.03)^9} \right]$
 (D) $3040 \left[\frac{(1 + 0.015)^{18} - 1}{0.015(1 + 0.015)^{18}} \right]$

- 19 Two sets of data, P and Q , are normally distributed. The mean of set Q is twice the mean of set P . The standard deviation of set Q is half the standard deviation of set P . The diagram which best represents this information is:



- 20 Jasmine wishes to take a holiday in 2 years from now and needs to have \$3950 saved. She can make monthly contributions into an account which earns interest at 0.8% per month. The amount of her monthly contribution is:

- (A) \$63.20
(B) \$149.94
(C) \$181.54
(D) \$1967.13

- 21 The marks from an examination are normally distributed with a mean of 55 and a standard deviation of 9. The percentage of students who scored a mark between 46 and 73 is:

- (A) 47.5%
(B) 68%
(C) 81.5%
(D) 95%

- 22 A box of chocolates contains milk, white and dark chocolates. The probability of choosing a milk chocolate is three times the probability of choosing a white chocolate. The probability of choosing a white chocolate is twice the probability of choosing a dark chocolate. Which of the following combinations could give the number of each type of chocolate in the box?

- (A) 4 milk, 12 white and 24 dark
(B) 18 milk, 6 white and 2 dark
(C) 24 milk, 4 white and 8 dark
(D) 24 milk, 8 white and 4 dark

Section II

78 marks

Attempt Questions 23–28

Allow about 2 hours for this section

Answer each question in a SEPARATE writing booklet. Extra writing booklets are available.

All necessary working should be shown in every question.

Question 23 (13 marks) Use a SEPARATE writing booklet.

Marks

- (a) Simplify each of the following expressions:

(i) $5mn - 2m - 4nm - 6m$

1

(ii) $\frac{a^2}{3b^3} + \frac{5ab}{6}$

2

- (b) A debating team consists of a first, second and third speaker. Tom, Liam and George are the Year 12 debating team for their school.

(i) In how many different ways can they fill the three speaker positions?

1

(ii) What is the probability that George will be the first speaker for his team?

1

(iii) What is the probability that, in team order, Liam will not directly follow George?

1

- (c) Betty and Garry want to purchase a new entertainment system. The price of the unit is \$8999. They decide on the following finance option:

- Deposit of \$999
- Interest on balance charged at a flat rate 12.5% p.a. for 3 years

They will repay the loan with equal monthly instalments over the 3 years.

(i) Calculate the amount of interest charged on the loan.

1

(ii) Calculate the monthly repayment they will need to make.

1

(iii) Calculate the total amount paid for the unit.

1

Question 23 continues on Page 11

Question 23 (continued)

Marks

- (d) In January 2004, the Coco Dog Food Company purchased a new packaging machine which cost \$36 500. After 3 years the salvage value of the machine was \$12 500.
- (i) If the straight line method is used, find the annual amount of depreciation. 1
- (ii) If the declining balance method is used, find the annual depreciation rate, correct to 1 decimal place. 1
- (iii) The company decides to sell the machine after 4 years. Which method of depreciation would you suggest the company use in order to gain the greatest tax benefit? Support your answer with mathematical calculations. 2

End of Question 23

Question 24 (13 marks) Use a SEPARATE writing booklet.

Marks

- (a) A farmer decides to use the capture-recapture method to estimate the present population of fish in his dam. He captures 15 fish, tags them and releases them back into the dam. Sometime later he nets 30 fish, of which 2 are tagged. What is his estimate of the current fish population? 2
- (b) Taren has a gross annual income of \$34 600. He has allowable deductions of \$3420. He must pay tax on all taxable income. His employer has deducted \$5965 in PAYG tax throughout the year.
- (i) Show that Taren's taxable income is \$31 180. 1
- (ii) Using the tax table below, calculate the income tax that Taren must pay. 1

Taxable Income	Tax Payable on Taxable Income
\$0 – \$6000	Nil
\$6001 – \$25000	15¢ for each \$1 over \$6000
\$25001 – \$75000	\$2850 plus 30¢ for each \$1 over \$25000
\$75001 – \$150000	\$17850 plus 40¢ for each \$1 over \$75000
Over \$150000	\$47850 plus 45¢ for each \$1 over \$150000

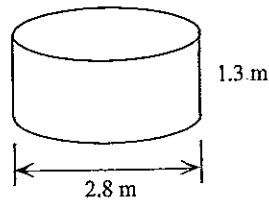
- (iii) Will Taren receive a refund or will he need to pay an additional amount in tax? What is the amount of his refund or tax bill? 2
- (c) A large office employs 6 executives, 30 secretaries, 20 clerks and 9 ancillary staff. The management of the office wishes to survey 15 staff members. They want a proportional representation of staff from each of these groups to be surveyed.
- (i) What is the name given to this type of sampling? 1
- (ii) How many secretaries should be surveyed? 1

Question 24 continues on Page 13

Question 24 (continued)

Marks

- (d) A water tank is to be made of insulated sheet metal. The tank is in the shape of a closed cylinder with a diameter of 2.8 metres and a height of 1.3 metres, as shown in the diagram below.

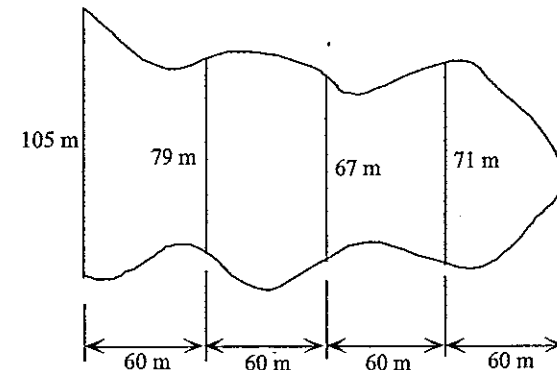


- (i) Find the volume of this water tank. Give your answer correct to the nearest cubic metre. 2
- (ii) Find the capacity, in litres, of the tank. 1
- (iii) Find the area of sheet metal required to construct the tank. Give your answer correct to the nearest square metre. 2

End of Question 24

- (a) Solve the equation: $\sqrt{1-9x} = 26$ 2
- (b) A 200 g can of insect spray contains 0.14 g of Bioresmethrin. Find the concentration, in grams per kilogram (g/kg), of Bioresmethrin. 2
- (c) Which of the following investment options would you choose to obtain the greatest return for your investment? 2
- Option I: \$6000 invested at 8% p.a. simple interest over 2 years
- Option II: \$6000 invested at 7.5% p.a., compounded monthly, over 2 years
- Support your answer with mathematical calculations.

(d)



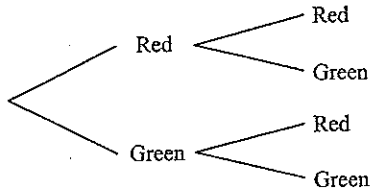
The diagram above shows the aerial view of a dam, with some dimensions also given.

- (i) Using two applications of Simpson's Rule, find the surface area of the dam. 2
- (ii) The dam, when full, has an average depth of 28 metres. Find an approximation for the volume of the dam. 1
- (iii) Due to the harsh drought conditions, the dam is only at 15% capacity. What amount of water is currently stored in the dam? 2
- (e) Julie and David will invest in an account to allow for the expenses of their son Jack's university degree. They estimate he will need \$1200 per month for the duration of his four year degree. Their credit union offers an account which pays 8.4% p.a., compounded monthly. Find the amount of money that Julie and David will need to invest at the start of the four year period to allow for this expense. 2

End of Question 25

- (a) Along a highway there are two sections of roadworks under construction. These two sections are controlled by red and green traffic lights. Anne has calculated that there is a 90% chance that the first set of lights are green and that there is a 70% chance that the second set of lights are green.

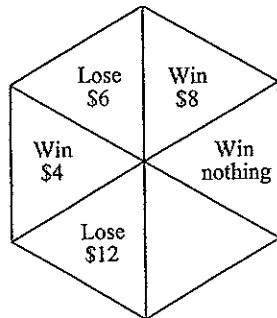
- (i) Copy the probability tree below into your writing booklet. Complete the probability tree by writing the correct probability on each branch. 2



- (ii) Calculate the probability that Anne will have a clear run (i.e. that both lights are green). 1

- (iii) Calculate the probability that Anne will have to stop at least once. 2

- (b) Sam is making up a spinner for a game, as shown in the diagram below. 2



Sam wants the financial expectation of the game to be 50¢ and has one section of the spinner to complete. What should be written in the last section of the spinner?

Question 26 continues on Page 16

- (c) An electronics shop sells two brands of DVDs, *Repro* and *Dupe*. Both brands sell for the same price. The shop decides to discontinue one of the brands. The shop records the sales of each brands in the 10 week period before one of the brands is discontinued. The sales are shown in the table below:

<i>Repro</i>	13	25	14	55	32	13	41	26	34	28
<i>Dupe</i>	21	26	18	26	31	34	33	19	40	33

- (i) Display this information in an ordered back-to-back stem-and-leaf plot. 2

- (ii) Copy and complete the table below. 2

	Mean	Median	Standard Deviation
<i>Repro</i>		27	
<i>Dupe</i>			6.9

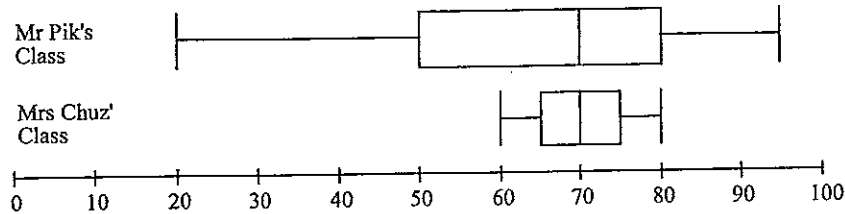
- (iii) Which brand should be discontinued? Give reasons for your answer. Which statistical measure best supports your argument. 2

End of Question 26

- (a) An insurance firm offered share packages to its shareholders. No brokerage fees or stamp duty were charged. Shares were offered according to the following schedule.

Number of shares (n)	Cost of shares (C)
272	\$1496.00
545	\$2997.50
727	\$3998.50
909	\$4999.50

- (i) The cost (C) of purchasing shares varies directly with the number of shares (n) purchased. Find an equation in the form $C = kn$ that relates n to C . 2
- (ii) Explain the significance of k , the constant of proportionality, in your equation in part (i). 1
- (iii) How much would it cost to purchase 800 shares under this plan? 1
- (b) The box-and-whisker plots below show the statistics of the results of Mr Pik's class and Mrs Chuz' class in a mathematics test.



- (i) Calculate the interquartile range of Mr Pik's class. 1
- (ii) What percentage of students in Mrs Chuz' class scored marks between 70 and 80 in each class? 1
- (iii) Compare and contrast the two data sets by examining the shape and skewness of the distribution and the measures of location and spread. 3

Question 27 continues on Page 18

- (c) The following table gives the future value of an investment of \$1 per month in an ordinary annuity at different interest rates and different periods of time.

Future Value of an Ordinary Annuity with an Investment of \$1 per month

Number of Months	Interest Rate (% p.a.)				
	12%	13%	14%	15%	16%
6	6.1520	6.1649	6.1777	6.1907	6.2034
12	12.6825	12.7415	12.8007	12.8604	12.9203
18	19.6147	19.7573	19.9011	20.0462	20.1926
24	26.9735	27.2417	27.5132	27.7881	28.0664

- (i) Find the value of an investment of \$550 per month after 2 years at 14% p.a. 1
- (ii) Find the total interest earned on the investment. 1
- (iii) The total amount invested over 2 years is \$13 200. If this amount is invested as a lump sum for 2 years, find the equivalent flat rate of interest which would give the same return. Give your answer as a percentage correct to 1 decimal place. 2

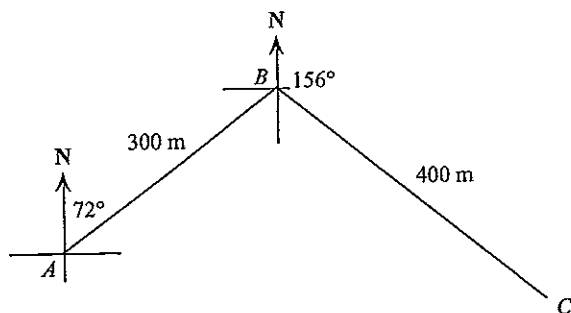
End of Question 27

Question 28 (13 marks) Use a SEPARATE WRITING BOOKLET.

- (a) A council surveyor recorded the number of pedestrian crossings in eight suburbs. The number of accidents involving pedestrians in those suburbs was also recorded. The results are shown in the table below.

Number of crossings (N)	8	11	12	13	5	8	10	14
Number of accidents (A)	10	6	5	2	12	8	7	1

- (i) Using a large, neat graph, display this data on a scatterplot with the number of crossings (N) on the horizontal axis and the number of accidents (A) on the vertical axis. 2
- (ii) What is the type of correlation that exists between the two variables N and A ? 1
- (iii) Comment on the relationship between the two variables. 1
- (b) A class is on a treasure hunt as part of their Sports, Lifestyle & Recreation course. They are given the following directions from base camp A . They are to walk on a bearing of 072° for 300 metres to point B . They are then to continue on a bearing of 156° for 400 metres to point C . They then return to base camp A .



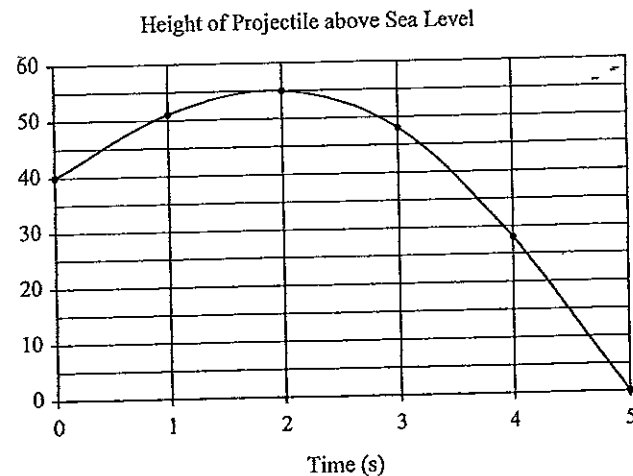
- (i) Show that $\angle ABC = 96^\circ$. 1
- (ii) Calculate AC , the distance that the class needs to travel on the final leg of their journey. Give your answer correct to the nearest metre. 2
- (iii) Find the bearing that the class needs to take from point C to return to base camp A . 2

Question 28 continues on Page 20

Question 28 (continued)

Marks

- (c) In a school experiment, a projectile was thrown from the top of a cliff. The height of the projectile above sea level was recorded at 1 second intervals. The results are shown in the graph below.



- (i) What was the height of the cliff? 1
- (ii) According to the graph above, what was the maximum height reached by the projectile? 1
- The height of the projectile above sea level can be modelled by the formula:

$$h = 40 + 17t - 5t^2$$
 where t is the time (in seconds) since the projectile was thrown and h is the height of the projectile (in metres) above sea level.
- (iii) Use this formula to estimate the height of the projectile after 2.5 seconds. Give your answer correct to the nearest metre. 1
- (iv) Explain why this model is unreliable for values of t which are greater than 5. 1

END OF EXAMINATION

EXAMINERS

Bill Waddell (Convenor)
 Patrick Curteis
 Neila Darrough
 Sue Hamilton
 Julie MacDougal

St Patrick's Marist College, Dundas
 Kambala, Rose Bay
 Bethany College, Hurstville
 St Vincent's College, Potts Point
 Rosebank College, Five Dock

CATHOLIC SECONDARY SCHOOLS ASSOCIATION OF NEW SOUTH WALES
YEAR 12 TRIAL HIGHER SCHOOL CERTIFICATE EXAMINATION 2007

GENERAL MATHEMATICS – MULTIPLE CHOICE ANSWER SHEET

Select the alternative A, B, C, or D that best answers the question. Fill in the response oval completely.

Sample $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9

A B C D

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

If you have changed your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:

A B ^{correct} C D

ATTEMPT ALL QUESTIONS

- | | | | | | |
|----------|----|-------------------------|-------------------------|-------------------------|-------------------------|
| Question | 1 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 2 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 3 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 4 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 5 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 6 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 7 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 8 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 9 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 10 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 11 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 12 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 13 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| | 14 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |

- | | | | | |
|----|-------------------------|-------------------------|-------------------------|-------------------------|
| 15 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 16 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 17 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 18 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 19 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 20 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 21 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 22 | A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |

Continue over page

Q 24.
25

General Mathematics

FORMULAE SHEET

Area of an annulus

$$A = \pi(R^2 - r^2)$$

R = radius of outer circle

r = radius of inner circle

Area of an ellipse

$$A = \pi ab$$

a = length of semi-major axis

b = length of semi-minor axis

Area of a sector

$$A = \frac{\theta}{360} \pi r^2$$

θ = number of degrees in central angle

Arc length of a circle

$$l = \frac{\theta}{360} 2\pi r$$

θ = number of degrees in central angle

Simpson's rule for area approximation

$$A \approx \frac{h}{3} (d_f + 4d_m + d_l)$$

h = distance between successive measurements

d_f = first measurement

d_m = middle measurement

d_l = last measurement

Surface area

Sphere $A = 4\pi r^2$

Closed cylinder $A = 2\pi r h + 2\pi r^2$

r = radius

h = perpendicular height

Volume

Cone $V = \frac{1}{3} \pi r^2 h$

Cylinder $V = \pi r^2 h$

Pyramid $V = \frac{1}{3} Ah$

Sphere $V = \frac{4}{3} \pi r^3$

r = radius

h = perpendicular height

A = area of base

Sine rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Area of a triangle

$$A = \frac{1}{2} ab \sin C$$

Cosine rule

$$c^2 = a^2 + b^2 - 2ab \cos C$$

or

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

FORMULAE SHEET

Simple interest

$$I = Prn$$

P = initial quantity

r = percentage interest rate per period, expressed as a decimal

n = number of periods

Compound interest

$$A = P(1+r)^n$$

A = final balance

P = initial quantity

n = number of compounding periods

r = percentage interest rate per compounding period, expressed as a decimal

Future value (A) of an annuity

$$A = M \left\{ \frac{(1+r)^n - 1}{r} \right\}$$

M = contribution per period, paid at the end of the period

Present value (N) of an annuity

$$N = M \left\{ \frac{(1+r)^n - 1}{r(1+r)^n} \right\}$$

or

$$N = \frac{A}{(1+r)^n}$$

Straight-line formula for depreciation

$$S = V_0 - Dn$$

S = salvage value of asset after n periods

V_0 = purchase price of the asset

D = amount of depreciation apportioned per period

n = number of periods

Declining balance formula for depreciation

$$S = V_0(1-r)^n$$

S = salvage value of asset after n periods

r = percentage interest rate per period, expressed as a decimal

Mean of a sample

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum fx}{\sum f}$$

\bar{x} = mean

x = individual score

n = number of scores

f = frequency

Formula for a z-score

$$z = \frac{x - \bar{x}}{s}$$

s = standard deviation

Gradient of a straight line

$$m = \frac{\text{vertical change in position}}{\text{horizontal change in position}}$$

Gradient-Intercept form of a straight line

$$y = mx + b$$

m = gradient

b = y-intercept

Probability of an event

The probability of an event where outcomes are equally likely is given by:

$$P(\text{event}) = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$$



CATHOLIC SECONDARY SCHOOLS ASSOCIATION
2007 TRIAL HIGHER SCHOOL CERTIFICATE EXAMINATION
GENERAL MATHEMATICS – MARKING GUIDELINES/SOLUTIONS

Section 1

Question 1 – Question 20 (1 mark each)

Question	Answer	Syllabus Assessed	Targeted Performance Bands
1	A	P2, P6	2-3
2	B	P2, P4, P11	2-3
3	D	P2, P6	2-3
4	B	P9, P11	3-4
5	C	P2, P6	3-4
6	A	P2, P3	3-4
7	C	P2, P7	3-4
8	D	H2, H4, H9	3-4
9	D	H2	3-4
10	B	H2, H7	3-4
11	C	H2, H5	3-4
12	C	H1, H2, H7	3-4
13	A	H3, H5, H11	4-5
14	D	H1, H2, H4, H5, H9	4-5
15	C	H6, H7	4-5
16	C	H2, H3, H10	4-5
17	A	H2, H11	4-5
18	B	H1, H2, H8	4-5
19	A	P2, P4	4-5
20	B	H2, H5	4-5
21	C	H2, H4; H5, H9	5-6
22	D	H4, H10, H11	5-6

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

3001-2

Section 2

Question 23 (13 marks)

Outcomes assessed: H2, H11

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(a)(i)	$5mn - 2m - 4nm - 6m$ $= mn - 8m$	1 mark for correct answer.	1

Outcomes assessed: H2, H11

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(a)(ii)	$\frac{a^2}{3b^3} \div \frac{5ab}{6} = \frac{a^2}{3b^3} \times \frac{6}{5ab}$ $= \frac{a^2}{3b^3} \times \frac{26}{5ab}$ $= \frac{2a}{5b^4}$	2 marks for correct answer. 1 mark for either correct cancellation or correct multiplication by reciprocal.	2

Outcomes assessed: P1, P10

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(b)(i)	$3 \times 2 \times 1 = 6$ or list Tom, Liam, George Tom, George, Liam Liam, George, Tom Liam, Tom, George George, Liam, Tom George, Tom, Liam	1 mark for correct answer.	1

Outcomes assessed: P1, P10

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(b)(ii)	$\frac{1}{3}$	1 mark for correct answer.	1

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: P1, P10

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(b)(iii)	$\frac{2}{3}$	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H5

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(c)(i)	$I = Prn$ $= 8000 \times 0.125 \times 3$ $= 3000$	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H5

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(ii)	Re payment = $\frac{8000 + 3000}{36} = \305.56	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H5

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(iii)	Total = $999 + 11000 = \$11999$	1 mark for correct answer.	1

Outcomes assessed: H5

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(d)(i)	$S = V_0 - Dn$ $12500 = 36500 - D \times 3$ $D = \$8000$	1 mark for correct answer.	1

Outcomes assessed: H2

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(d)(ii)	$S = V_0(1-r)^n$ $12500 = 36500(1-r)^3$ $r = 0.300$ $= 30.0\%$	1 mark for correct answer.	1

Outcomes assessed: H8, H11

Targeted Performance Bands: 5-6

	Solution	Criteria	Marks
(d)(iii)	Straight Line: $S = 36500 - (4 \times 8000)$ $= \$4500$ Declining Balance: $S = 36500(1-0.3)^4$ $= \$8745.45$ Straight Line Depreciation should be used because it produces the greater depreciation and therefore the tax deduction.	2 marks for working and justification for answer. 1 mark for significant progress towards the answer.	2

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Question 24 (13 marks)

Outcomes assessed: P1, P11

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(a)	$\frac{15}{P} = \frac{2}{30}$ $P = 225$	2 marks for correct answer. 1 mark for any progress towards answer.	2

Outcomes assessed: P2, P7

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(b)(i)	$\$34600 - \$3420 = \$31180$	1 mark for correct answer.	1

Outcomes assessed: P2, P7

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(b)(ii)	$2850 + (0.3 \times 6180) = \4704	1 mark for correct answer.	1

Outcomes assessed: P2, P7

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(b)(iii)	$\$5965 - \$4704 = \$1261$ A refund	1 mark for correct amount. 1 mark for indicating 'refund'.	2

Outcomes assessed: P1, P11

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(c)(i)	Stratified sampling	1 mark for correct answer.	1

Outcomes assessed: P1, P11

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(ii)	$\frac{30}{65} \times 15 = 7$ secretaries	1 mark for correct answer.	1

Outcomes assessed: P2, P6

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(d)(i)	$V = \pi r^2 h$ $= \pi \times 1.4^2 \times 1.3$ $= 8m^3$	2 marks for correct answer. 1 mark for progress towards answer.	2

Outcomes assessed: P2, P6

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(d)(ii)	$C = 8 \times 1000 = 8000 \text{ litres}$	1 mark for correct answer	1

Outcomes assessed: H1, H2, H3, H6, H7

Targeted Performance Bands: 2-3

	Solution	Criteria	Marks
(d)(iii)	$SA = 2\pi rh + 2\pi r^2$ $= (2 \times \pi \times 1.4 \times 1.3) + (2 \times \pi \times 1.4^2)$ $= 23.75m^2$ $= 24m^2$	2 marks for correct answer. 1 mark for progress towards answer.	2

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Question 25 (13 marks)

Outcomes assessed: H2, H3, H11

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(a)	$\sqrt{1-9x} = 26$ $1-9x = 676$ $-9x = 675$ $-x = -75$	2 marks for correct solution 1 mark for correctly squaring both sides of the equation or for correct progress following incorrect squaring of both sides of the equation	2

Outcomes assessed: P2, P7

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(b)	$\frac{0.14}{200} = \frac{x}{1000}$ $x = 0.7 \text{ g/kg}$	2 marks for correct answer. 1 mark for working towards a correct answer.	2

Outcomes assessed: P2, P11

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(c)	$I = Prn$ $= 6000 \times 0.08 \times 2$ $= 960$ $A_1 = \$6960$ $A_2 = P(1+r)^n$ $= 6000(1 + \frac{0.075}{12})^{24}$ $= \$6967.75$ Ans. Option II by \$7.75	2 marks for correct calculations and conclusion. 1 mark for significant progress towards answer.	2

7

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: H1, H2, H3, H6, H7

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(d)(i)	$A = \frac{60}{3}(105 + 4 \times 79 + 67) + \frac{60}{3}(67 + 4 \times 71 + 0)$ $= 16780m^2$	2 marks for correct substitution into equation and correct answer. 1 mark for progress towards answer.	2

Outcomes assessed: H1, H2, H3, H6, H7

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(d)(ii)	Volume = $16780 \times 28 = 469\,840m^3$	1 mark for correct answer	1

Outcomes assessed: H1, H2, H3, H6, H7

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(d)(iii)	$\frac{15}{100} \times 469840$ $= 70467m^3$ $= 70467kL$	2 marks for correct answer. 1 mark for progress towards answer.	2

Outcomes assessed: H5

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(e)	$N = 1200 \left(\frac{(1 + \frac{0.084}{12})^{48} - 1}{0.007(1.007)^{48}} \right)$ $= \$48,778.27$ Graphics Calculator N=48 I%=8.4 PMT=1200 FV=0 P/Y=12	2 marks for correct answer	2

8

DISCLAIMER

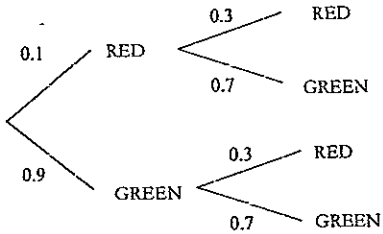
The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Question 26 (13 marks)

Outcomes assessed: H2, H10, H11

Targeted Performance Bands: 2-3

	Solution	Criteria	Marks
(a)(i)		<p>2 marks for all branches with correct probabilities.</p> <p>1 mark for at least one set of branches correctly filled in.</p>	2

Outcomes assessed: H2, H10, H11

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(a)(ii)	$P(\text{both green}) = 0.9 \times 0.7 = 0.63$	1 mark for correct answer	1

Outcomes assessed: H2, H10, H11

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(a)(iii)	$P(\text{at least one stop}) = 1 - P(\text{no stops})$ $= 1 - 0.63$ $= 0.37$	<p>2 marks for correct answer.</p> <p>1 mark for progress towards answer.</p>	2

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: H2, H4, H10, H11

Targeted Performance Bands: 5-6

	Solution	Criteria	Marks
(b)	$\frac{1}{6} \times (-6) + \frac{1}{6} \times (-12)$ $+ \frac{1}{6} \times 4 + \frac{1}{6} \times 8 + \frac{1}{6} \times x + \frac{1}{6} \times 0$ $= 0.5$ $-1 - 2 + \frac{2}{3} + \frac{1}{3} + \frac{1}{6}x = 0.5$ $-1 + \frac{1}{6}x = 0.5$ $\frac{1}{6}x = 1.5$ $x = 9$ <p>The sector would have to read "Win \$9"</p>	<p>2 marks for correct answer.</p> <p>1 mark for working towards a correct answer. Multiplying some of the values by $\frac{1}{6}$, ie using expectations.</p>	2

Outcomes assessed: H1, H2

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks																				
(c)(i)	<table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">'Repro'</td> <td style="padding: 2px 5px;">4 3 3</td> <td style="border-right: 1px solid black; padding: 2px 5px;">1</td> <td style="padding: 2px 5px;">8 9</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">8 6 5</td> <td style="border-right: 1px solid black; padding: 2px 5px;">2</td> <td style="padding: 2px 5px;">1 6 6</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">4 2 3</td> <td style="border-right: 1px solid black; padding: 2px 5px;">1 3 3 4</td> <td></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">1 4</td> <td style="border-right: 1px solid black; padding: 2px 5px;">0</td> <td></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">5 5</td> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td></td> </tr> </table>	'Repro'	4 3 3	1	8 9		8 6 5	2	1 6 6		4 2 3	1 3 3 4			1 4	0			5 5			<p>1 mark for correct 'Repro' plot.</p> <p>1 mark for correct 'Dupe' plot.</p>	2
'Repro'	4 3 3	1	8 9																				
	8 6 5	2	1 6 6																				
	4 2 3	1 3 3 4																					
	1 4	0																					
	5 5																						

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: P2, P4

Targeted Performance Bands: 3-4

(c)(ii)	Solution			Criteria 2 marks for correct answers. 1 mark for some correct answers.	Marks 2
	Mean	Median	Standard Deviation		
	"Repro"	28.1	27		
"Dupe"	28.1	28.5	6.9		

Outcomes assessed: H1, H4, H5

Targeted Performance Bands: 4-5

(c) (iii)	Solution	Criteria	Marks
	The store should discontinue 'Repro' because while it has the same mean or average sales 'Dupe' has a lower standard deviation which means it sells more consistently and so will be probably easier to sell.	1 mark for correct brand. 1 mark for a correct explanation.	2

Question 27 (13 marks)

Outcomes assessed: P3, P4, P5

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
(a)(i)	When $n = 272$, $C = 1496$. $\therefore 1496 = k \times 272$ $272k = 1496$ $k = 5.5$ \therefore Equation is $C = 5.5n$	2 marks for correct equation. 1 mark for calculation of correct value of k or equation consistent with incorrect calculation of k .	2

Outcomes assessed: P3, P4

Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
(a)(ii)	The value of 5.5 for k represents a cost of \$5.50 per share.	1 mark for correct answer (Cost per share)	1

Outcomes assessed: P2, P3

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(a)(iii)	Cost = 5.5×800 = \$4400	1 mark for correct answer or correct calculation from incorrect equation in (i) or equivalent.	1

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(b)(i)	$80 - 50 = 30$	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(b)(ii)	50%	1 mark for correct answer.	1

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 5-6

	Solution	Criteria	Marks
(b)(iii)	Shape & skewness: Mr. Pik-negative skew Mrs. Chuz-symmetrical Location: both have the same median value. Spread: Mrs. Chuz's is more consistent due to smaller IQR and range. Mr. Pik's has a wider spread (greater IQR and range) of marks with 25% scoring equal to or above Mrs. Cruz's highest mark and 25% below his lowest mark.	3 marks for correct comments on each aspect. 2 marks for significant correct comments. 1 mark for some relevant and correct comment.	3

Outcomes assessed: H2, H6

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(i)	$550 \times 27.5132 = \$15132.26$	1 mark for correct answer.	1

Outcomes assessed: H2, H6

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(ii)	$15132.26 - (24 \times 550) = \1932.26	1 mark for correct answer.	1

Outcomes assessed: H1, H6

Targeted Performance Bands: 5-6

	Solution	Criteria	Marks
(c)(iii)	$I = Prn$ $1932.26 = (24 \times 550) \times r \times 2$ $r = 7.3\%$	2 marks for correct answer. 1 mark for progress towards answer.	2

Question 28 (13 marks)

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(a)(i)	<p style="text-align: center;">Crossings and Accidents</p>	1 mark for correct axes. 1 mark for correct dot plot.	2

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(a)(ii)	Negative correlation.	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H4, H5, H9

Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
(a)(iii)	The Number of accidents decreased as the crossings increased.	1 mark for correct answer.	1

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

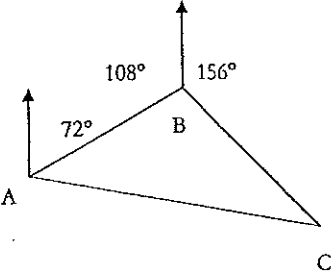
DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: H1, H2, H6, H7

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(b)(i)	 <p>$\angle ABC = 360^\circ - (108^\circ + 156^\circ) = 96^\circ$</p>	1 mark for correct answer.	1

Outcomes assessed: H1, H2, H6, H7

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
(b)(ii)	$AC^2 = 300^2 + 400^2 - 2 \times 300 \times 400 \times \cos 96^\circ$ $AC = 524.4872\dots$ $= 524\text{m}$	2 marks for correct substitution and answer. 1 mark for progress towards answer.	2

Outcomes assessed: H1, H2, H6, H7

Targeted Performance Bands: 5-6

	Solution	Criteria	Marks
(b)(iii)	$\angle ABC = ?$ $\frac{\sin C}{300} = \frac{\sin 96^\circ}{524}$ $\angle C = 34.71^\circ$ $\text{Bearing} = 360^\circ - (34.67^\circ + 24^\circ)$ $= 301^\circ$	2 marks for correct substitution and answer. 1 mark for significant progress towards answer.	2

Outcomes assessed: H2, H5

Targeted Performance Bands: 2-3

	Solution	Criteria	Mark
(c)(i)	Height of cliff = 40 m	1 mark for correct answer	1

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.

Outcomes assessed: H2, H3, H5

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(ii)	Maximum height = 55 m	1 mark for correct answer	1

Outcomes assessed: H3, H5

Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
(c)(iii)	$h = 40 + 17t - 5t^2$ $= 40 + 17(2.5) - 5(2.5)^2$ $= 51.25$ $= 51 \text{ m}$	1 mark for correct answer	1

Outcomes assessed: H2, H3, H5, H11

Targeted Performance Bands: 5-6

	Solution	Criteria	Mark
(c)(iv)	The model is used only for heights above sea level. The projectile hits the water after 5 seconds, so after that the projectile will no longer be above sea level. Water will slow down the speed of the projectile, so the formula becomes unreliable.	1 mark for correct answer	1

DISCLAIMER

The information contained in this document is intended for the professional assistance of teaching staff. It does not constitute advice to students. Further it is not the intention of CSSA to provide specific marking outcomes for all possible Trial HSC answers. Rather the purpose is to provide teachers with information so that they can better explore, understand and apply HSC marking requirements, as established by the NSW Board of Studies.

No guarantee or warranty is made or implied with respect to the application or use of CSSA Marking Guidelines in relation to any specific trial exam question or answer. The CSSA assumes no liability or responsibility for the accuracy, completeness or usefulness of any Marking Guidelines provided for the Trial HSC papers.