



SCEGGS Darlinghurst

2005

Higher School Certificate
Trial Examination

Centre Number

Student Number

General Mathematics

This is a TRIAL PAPER only and does not necessarily reflect the content or format of the Higher School Certificate Examination for this subject.

General Instructions

- Reading time – 5 minutes
- Working time – 2½ hours
- Write using black or blue pen
- Diagrams should be drawn in pencil
- Board-approved calculators may be used
- A formulae sheet is provided at the back of this paper

Total marks – 100
Assessment Weighting – 40%

Section I Pages 1–8

22 marks

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

Section II Pages 10–23

78 marks

- Attempt Questions 23–28
- Allow about 2 hours for this section
- Start each question in a NEW booklet

Section I

22 marks

Attempt Questions 1–22

Allow about 30 minutes for this section

All questions are of equal value.

Use the 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 change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word *correct* and drawing an arrow as follows.

A B C D

correct →

1 What is the range of the following set of scores?

10 10 11 11 11 15 18 18 20 21

- (A) 8
- (B) 10
- (C) 11
- (D) 21

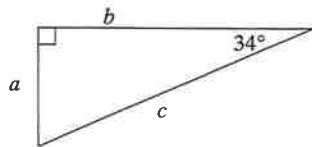
2 Buttercup invests \$5000 in ING Direct for 3 years, earning 6% p.a. compounded annually. How much interest does Buttercup earn in the 3 years?

- (A) \$900
- (B) \$955.08
- (C) \$5900
- (D) \$5955.08

3 Simplify the expression $2(3x - 4) - 2(4 - 3x)$.

- (A) $6x - 8$
- (B) -16
- (C) $12x - 16$
- (D) $12x$

4 What is the correct expression for $\cos 34^\circ$ in this triangle?



NOT TO SCALE

- (A) $\frac{a}{c}$
- (B) $\frac{a}{b}$
- (C) $\frac{b}{a}$
- (D) $\frac{b}{c}$

5 Use the experimental data in the table to find the relative frequency of tossing a head.

Heads	32
Tails	18

- (A) 18%
- (B) 32%
- (C) 36%
- (D) 64%

6 Which of the following is an example of categorical data?

- (A) The distance travelled by a person's car in 1 year.
- (B) The number of cars in each home.
- (C) The type of car that is in each home.
- (D) The amount of money spent on petrol in 1 year.

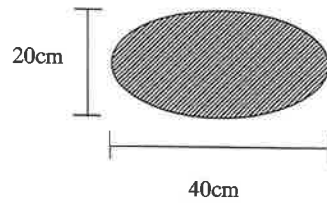
7 If $E = mc^2$, $E = 1.93 \times 10^7$ and $c = 3 \times 10^8$, what is the value of m correct to three significant figures?

- (A) 2.14×10^{-10}
- (B) 2.144×10^{-10}
- (C) 2.145×10^{-10}
- (D) 2.15×10^{-10}

8 Marianne buys a new violin for \$4500. Each year, the violin depreciates by \$300. Calculate the salvage value of the violin after 3 years, correct to the nearest dollar.

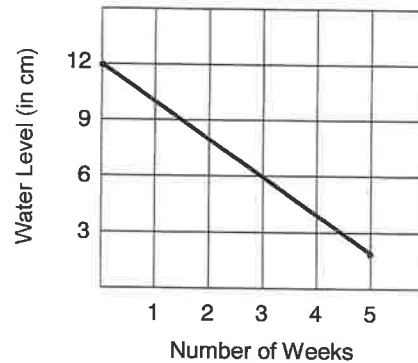
- (A) \$3400
- (B) \$3600
- (C) \$3659
- (D) \$3920

- 9 What is the area of this ellipse, correct to the nearest square centimetre?



NOT TO SCALE

- (A) 125
(B) 200
(C) 628
(D) 2513
- 10 Katherine drew this graph of the water level in her newly installed water tanks over a number of weeks.



What is the gradient of the line?

- (A) -4
(B) 4
(C) -2
(D) 2
- 11 What is the local time in Port Moresby (9°S , 147°E) when it is 2pm in Greenwich?
- (A) 2.12 am
(B) 4.12 am
(C) 9.48 pm
(D) 11.48 pm
- 12 The marks from the General Mathematics Trial Examination are normally distributed with a mean of 72% and a standard deviation of 4%. Approximately what proportion of students scored a mark between 64% and 76%?
- (A) 34%
(B) 68%
(C) 81.5%
(D) 99.7%
- 13 Sydney Council Wildlife Officers are trying to estimate the size of the bat population in the Botanical Gardens. They capture 60 bats, tag them, and then release them. Another 50 are caught and 7 bats have tags. The size of the bat population can be estimated as:
- (A) 110
(B) 430
(C) 2100
(D) 3000
- 14 How many three digit numbers can be formed using the digits 2, 3, 6, 7 and 8 if each digit cannot be used more than once?
- (A) 10
(B) 60
(C) 120
(D) 125

15 Wendy has 2000 shares in Tattersalls. The market value of each share is \$17.50 and the dividend paid in December 2005 is 80c per share. Calculate the dividend yield for the Tattersalls shares.

- (A) 0.875%
- (B) 1.09%
- (C) 3.61%
- (D) 4.57%

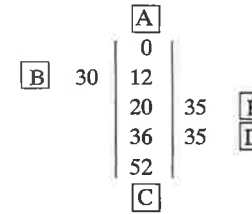
16 Sally has a credit card. She is charged 0.04% interest per day on outstanding balances. Sally buys two stuffed camels for \$54 each on the 8th August. How much interest does Sally pay if she pays off her credit card on 10th September?

- (A) \$0.71
- (B) \$1.43
- (C) \$71.28
- (D) \$142.56

17 The diameter of a Hillary Duff CD is measured to be 11.8cm, correct to the nearest millimetre. The percentage error in this measurement is closest to:

- (A) 0.4%
- (B) 0.5%
- (C) 0.85%
- (D) 4.24%

18 The following is a field book diagram of a vineyard in Mudgee. All measurements are given in metres.



The area of AEDC, correct to the nearest square metre is:

- (A) 780
- (B) 910
- (C) 1190
- (D) 1970

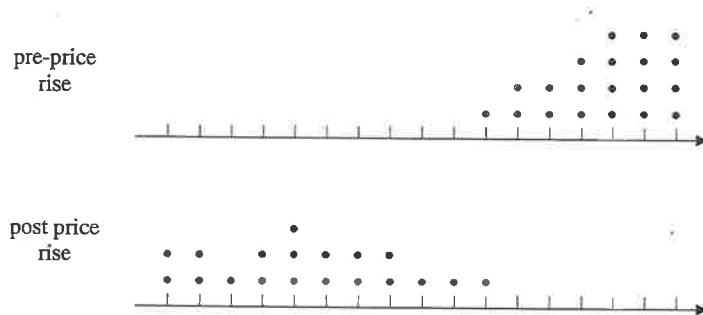
19 The solution of $\frac{x-2}{3} + 4 = \frac{x}{5}$ is:

- (A) -25
- (B) $-4\frac{1}{6}$
- (C) -1
- (D) 3

20 Liz invests \$50000 to fund a monthly sponsorship annuity to cover the running costs of her favourite soccer team. Calculate the amount of the monthly sponsorship given that the money is invested for 25 years, at a rate of 9%p.a. compounded monthly.

- (A) \$419.60
- (B) \$424.19
- (C) \$445.98
- (D) \$590.31

- 21 The average daily number of calls made by twenty customers of the Do-Tell Phone Company prior to a price rise, is shown on the dot plot immediately below.



The dot plot immediately above which has the same scale, shows the average daily number of calls made by the same twenty customers after Do-Tell increased their prices.

Which one of the following sentences is true in relation to the change in the number of calls made?

- (A) There was a decrease in the mean and a decrease in the standard deviation.
 - (B) There was a decrease in the mean and an increase in the standard deviation.
 - (C) There was an increase in the mean and a decrease in the standard deviation.
 - (D) There was an increase in the mean and an increase in the standard deviation.
- 22 On a game show on television, Melissa is given a car key that will open the door of one of five cars. Melissa is given two chances at opening a car door. If she can open a car door she wins the car.

What is the probability that Melissa wins a car on her second chance?

- (A) $\frac{1}{4}$
- (B) $\frac{2}{5}$
- (C) $\frac{4}{25}$
- (D) $\frac{1}{5}$

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End of Section I

Section II

78 marks

Attempt Question 23–28

Allow about 2 hours for this section

Answer each question in a NEW writing booklet.

All necessary working should be shown in every question.

Marks may be deducted for careless or badly arranged work.

Question 23 (13 marks)

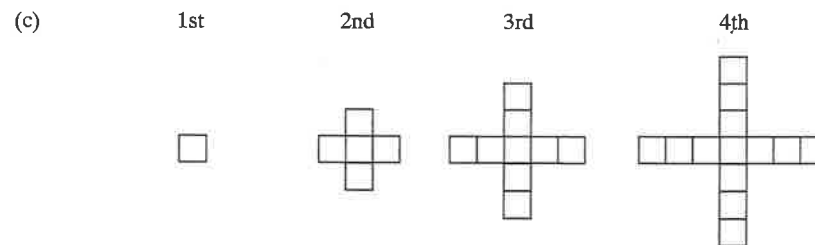
Marks

- (a) Calculate the surface area of a sphere of radius 12cm, correct to 1 decimal place. 2
- (b) Results for a university entrance aptitude test are given as z-scores. In this test, Dwayne gains a z-score of -1.2 .
- (i) Interpret Dwayne's score with reference to the mean and standard deviation of the test. 2
- (ii) His twin brother, Wayne, gains a z-score of 1.5. Calculate Wayne's score if the mean is 24 and the standard deviation is 6. 1

Question 23 continues on page 11

Question 23 (continued)

Marks



- (i) Copy and complete this table to show the number of squares used to draw these cross patterns. 1

Cross number	1st	2nd	3rd	4th	5th	6th
Squares	1	5	9			

- (ii) Write an algebraic expression for the number of squares, s , required for the n th cross. 2
- (iii) How many squares are used to draw the 300th cross? 1

- (d) David decides to borrow \$400 000 over a period of 20 years at a rate of 7.5% per annum.

Monthly Repayment Table				
Principal and interest per \$1000 borrowed				
Interest rate (p.a.)	Term of Loan – years			
	15	20	25	30
6.5%	8.71	7.46	6.75	6.32
7.0%	8.99	7.75	7.07	6.65
7.5%	9.27	8.06	7.39	6.99
8.0%	9.56	8.36	7.72	7.34

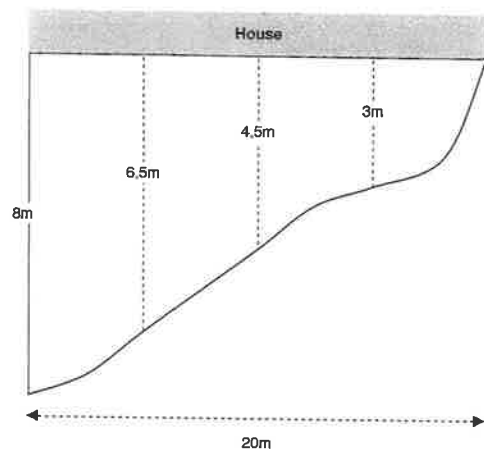
- (i) Using the Monthly Repayment Table, calculate David's monthly repayments. 2
- (ii) How much interest does he pay over the 20 years? 2

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

Marks

- (a) Bob is building a deck onto the back of his house.

3



NOT TO SCALE

Use Simpson's Rule to approximate the area of the deck to the nearest square metre.

Question 24 continues on page 13

Question 24 (continued)

Marks

- (b) Two travel companies, "Toolan's Tours" and "Vassie's Ventures" take people on wildlife safaris in Africa.

This back to back stem-and-leaf plot shows the time, in minutes, after they leave their base camp, it took each company to see the first lion.

Toolan's Tours		Vassie's Ventures
9 7	0	6
6 6 4 4 4 0	1	1 2 3 8
9 5 1	2	1 1 1 4 9
8 3	3	2 4
	4	0

- (i) Copy and complete the missing values in this statistics summary of the data into your answer book.

2

	Toolan's Tours	Vassie's Ventures
Mean		21.69
Median		21
Mode		21
Interquartile Range		18
Standard deviation (σ_n)		9.59

- (ii) Thanom is going on safari in Africa and would like to see a lion as soon as possible. Which company should she choose? Justify your answer with reference to measures of location and spread.

3

- (c) Paul plays a game involving tossing two coins. He wins \$5 if both coins show heads and \$1 for a head and a tail, but loses \$6 if they both show tails.

2

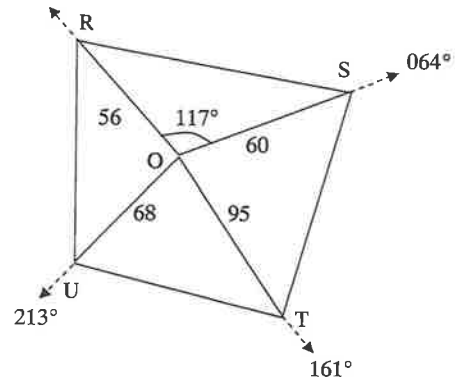
Calculate the financial expectation for this game.

Question 24 continues on page 14

Question 24 (continued)

Marks

- (d) The diagram shows a radial survey of a paddock. The measurements are all in metres.

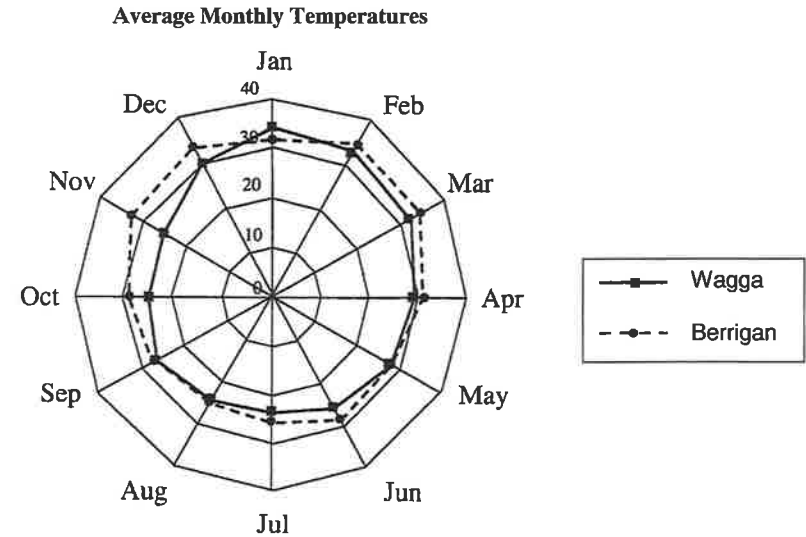


- (i) Calculate the area of the triangular section UOT correct to 1 decimal place. 2
- (ii) What is the bearing of R from O? 1

Question 25 (13 marks) Use a SEPARATE writing booklet.

Marks

- (a) The radar chart below shows the average monthly temperatures of Wagga and Berrigan.



- (i) In which month was the average monthly temperature in Berrigan less than that of Wagga? 1
- (ii) Maud examined the radar chart and said:
“Wagga is warmer than Berrigan for most of the year.” 2
 Comment on the validity of her statement.

Question 25 continues on page 16

Question 25 (continued)

Marks

- (b) Gamblers Anonymous is preparing a report on teenage gambling. A lie detector test was administered to 180 teenagers.
- (i) Copy the table into your writing booklet and complete it.

2

	Test indicated a lie	Test did not indicate a lie
Teenagers who lied about gambling		8
Teenagers who did not lie about gambling	23	
		117

- (ii) For what percentage of the teenagers tested was the test accurate?
- (iii) If a teenager who lied about gambling was selected at random, what is the probability that the test would have indicated that she did not lie?

2

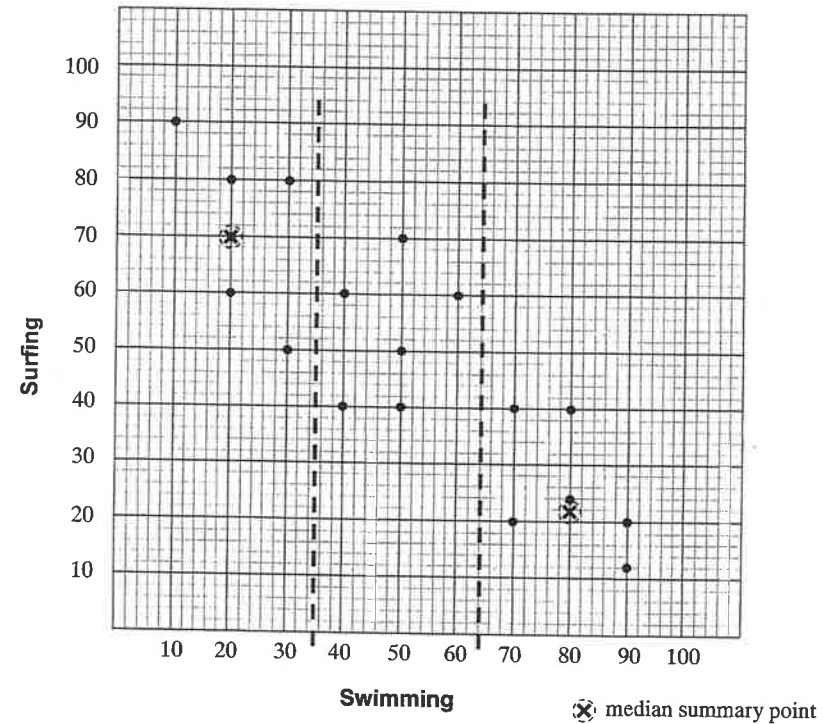
1

Question 25 continues on page 17

Question 25 (continued)

Marks

- (c) Jenny enjoys both surfing and swimming. Over the Christmas holidays, she asked her 18 friends to record how many times they went surfing and swimming. This graph shows the results.



- (i) Two median summary points have been marked on the graph. On the graph on page 25 (attached), mark the third median summary point and draw the median regression line. ATTACH THIS PAGE TO YOUR BOOKLET FOR QUESTION 25.

2

- (ii) Find the equation of the median regression line.

2

- (iii) Describe the correlation between swimming and surfing among Jenny's friends.

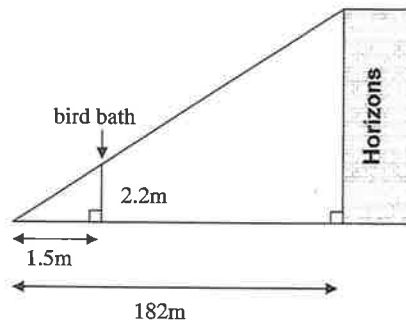
1

Question 26 (13 marks) Use a SEPARATE writing booklet.

Marks

To commemorate the 110th Birthday of SCEGGS in July, 2005, the Old Girls' Union has given the school a large bird bath, made of Italian marble.

- (a) If the bird bath cost \$4246, including 10% GST, calculate the amount of GST the Old Girls' Union paid. **1**
- (b) The bird bath depreciates at 2% p.a. Use the declining balance method to calculate the value of the bird bath in July, 2008. **2**
- (c) What tax deduction can be claimed for the bird bath for the 2008-2009 financial year? **2**
- (d) On a sunny day, a General Mathematics class records the length of two shadows – one of the bird bath and one of Horizons. **2**



NOT TO SCALE

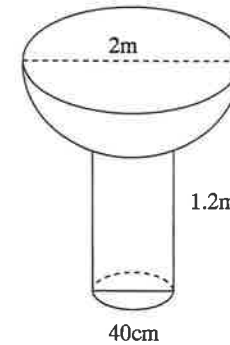
Calculate the height of Horizons, correct to the nearest metre.

Question 26 continues on page 19

Question 26 (continued)

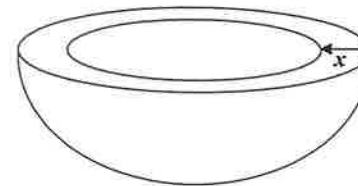
Marks

(e)



The bowl of the bird bath is a hemisphere measuring 2m in diameter. It stands on a solid cylindrical stand which is 1.2m tall and has a diameter of 40cm. Calculate the total volume of the bird bath and stand, correct to two decimal places. Give your answer in cubic metres. **3**

- (f) When filled to the top, the bowl of the bird bath holds 1527 litres of water. **3**



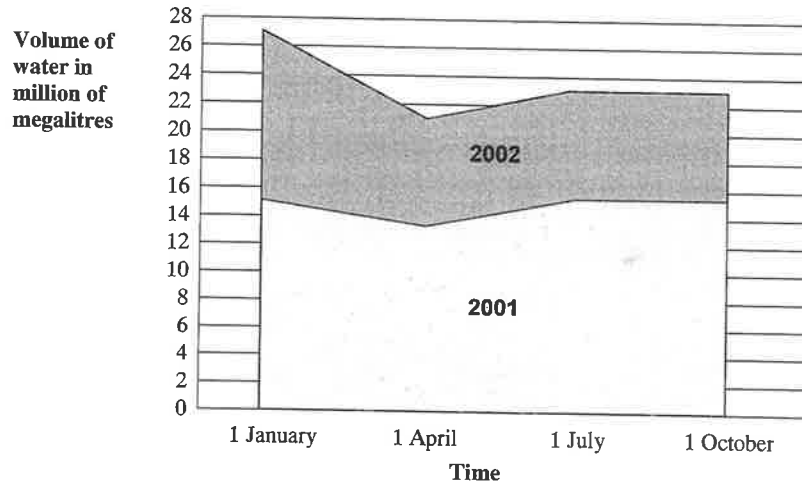
Calculate the thickness of marble, x , used in the bowl of the bird bath. ($1 \text{ m}^3 = 1000\text{L}$).

Question 27 (13 marks) Use a SEPARATE writing booklet.

Marks

- (a) This area graph shows the total volume of water in the 22 largest dams in NSW during 2001 and 2002. The reading of the volume of water in the dams was taken on 1 January, 1 April, 1 July and 1 October each year. The readings are in millions of megalitres.

Area graph of the total volume of water in NSW's largest dams



- (i) What was the total volume of water in the dams on 1 January, 2001? 1
- (ii) Calculate the percentage decrease in the total volume of water in the dams from 1 January 2001 to 1 January 2002. 2
- (b) (i) Change the subject of the formula $C = 5 + 2L^2$ to L . 2
- (ii) Find the value(s) of L , correct to two decimal places, when $C = 20$. 2

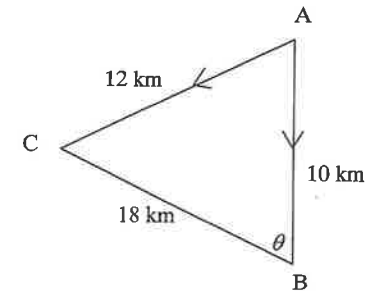
Question 27 continues on page 21

Question 27 (continued)

Marks

- (c) (i) Draw an accurate box and whisker plot that illustrates this data: 2
- The distance between the median and the upper quartile is twice the distance from the median to the lower quartile.
 - The length of each of the whiskers is half the length of the interquartile range.
- (ii) Is the distribution skewed? If so, in what direction? 1
- (d) During a yacht race, Mary sails directly south from Point A, for 10 km until she arrives at Point B. Frederik sails 12 km from Point A to Point C. 3

If Points B and C are 18 km apart, find the bearing of Point C from Point B, correct to the nearest minute.



Question 28 (13 marks) Use a SEPARATE writing booklet.

Marks

Ethel is the first Senior Citizen to successfully star in a series of *Big Brother*.

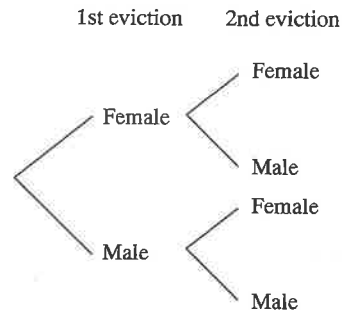
- (a) The location of the Big Brother House is $(16^{\circ}\text{S}, 151^{\circ}\text{E})$.
Find the distance between the Big Brother House and Ethel's family home in Sydney $(34^{\circ}\text{S}, 151^{\circ}\text{E})$ in nautical miles. **2**

- (b) After six weeks, four men and three women remain in the Big Brother House. Two people will soon be randomly selected by Big Brother for eviction instead of being voted out by the general public.

- (i) If **one person** is selected at random, what is the probability that this person is male? **1**

- (ii) **Two people** are to be randomly selected for eviction from the Big Brother House.

1. Copy the tree diagram and complete the diagram by writing the probabilities on all the branches. **2**



2. Calculate the probability that the selection includes exactly one female. **2**

- (iii) Ethel is one of the women in the Big Brother House. Before the two people are randomly selected for eviction, Ethel calculates her chance of remaining in the Big Brother House. **2**

She concludes that she has "*a better than even chance*" of remaining in the house. Do you agree? Justify your answer with appropriate calculations.

Question 28 continues on page 23

Question 28 (continued)

Marks

- (c) Against all odds, Ethel wins *Big Brother* and the 1 million dollar prize money. She decides to invest the money for 10 years. **4**

- Bank NSW offers her 5.5% p.a. interest compounded monthly.
- Sydney Savings offers her 5.8% p.a. interest compounded quarterly.

If Ethel requires 1.75 million dollars to release her Greatest Hits CD in 10 years time, which investment option should she choose?

Justify your answer with appropriate calculations.

End of paper

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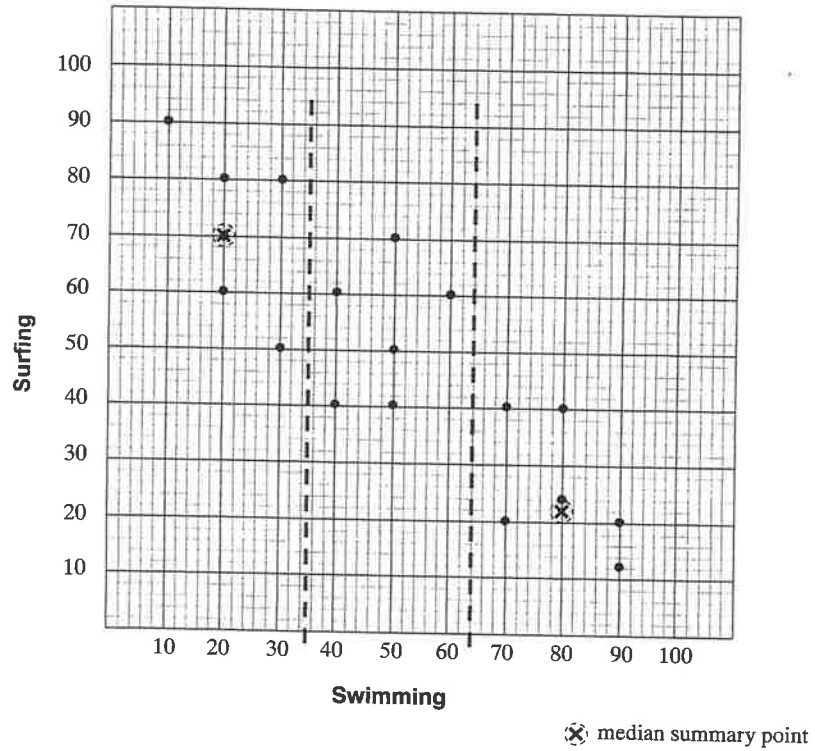
Centre Number

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Student Number

This page is to be detached, completed and handed in with the rest of your answers for Question 25.

Question 25 (c)



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General Maths
2005 Trial Exam.
Solutions + Marking Scale.

SECTION I: Multiple Choice

Summary:

1. C 7. A 13. B 18. C
2. B 8. B 14. B 19. A
3. C 9. C 15. D 20. A
4. D 10. C 16. B 21. B
5. D 11. D 17. A 22. D
6. C 12. C

1. Range = Max - min
= 21 - 10
= 11 (C)

2. $n = 3$
 $I\% = 6$
 $PV = 5000$ $FV = \$5955.08$
 $PMT = 0$ \therefore Interest = \$955.08
 $FV = ?$ (B)

3. $2(3x - 4) - 2(4 - 3x)$
= $6x - 8 - 8 + 6x$
= $12x - 16$ (C)

4. $\cos 34 = \frac{\text{adj}}{\text{hyp}} = \frac{b}{c}$ (D)

5. $\frac{32}{50} = 64\%$ (D)

6. Car type is categorical. (C)

7. $E = mc^2$
 $1.93 \times 10^7 = m \times (3 \times 10^8)^2$
 $\therefore m = 2.14 \times 10^{-10}$ (A)

8. $S = V_0 - Dn$
= $4500 - 300 \times 3$
= \$3600 (B)

9. $A = \pi ab$
= $\pi \times 10 \times 20$
= 628 (C)

10. grad is negative.
 $\frac{\text{rise}}{\text{run}} = \frac{6}{3} = 2$
 \therefore Grad = -2 (C)

11. Time diff = $147^\circ \times 4$
= 588 min
= 9 hr 48 min
 \therefore Time in Moresby is 11:48 pm (D)

12. $\frac{13.5 \quad 34 \quad -34}{-3 \quad -3 \quad -1 \quad x \quad +1 \quad +2 \quad +3}$
 $\frac{60 \quad 64 \quad 68 \quad 72 \quad 76 \quad 80 \quad 84}{\% = 13.5 + 34 + 34}$
= 81.5% (C)

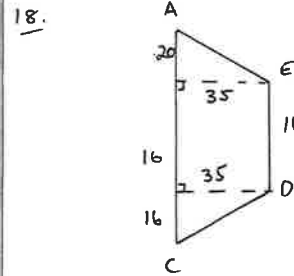
13. $\frac{60}{x} = \frac{7}{50}$
 $\therefore \frac{x}{60} = \frac{50}{7}$
 $x = 60 \times \frac{50}{7} = 428$ (B)

14. $5 \times 4 \times 3 = 60$ (B)

15. $\frac{0.80}{17.5} \times 100 = 4.57\%$ (D)

16. 8th Aug \rightarrow 10th Sept = 33 days
 $I = Prn$
= $108 \times \frac{0.04}{100} \times 33 = \1.43 (B)

17. $\frac{0.5}{118} \times 100 = 0.4\%$ (A)



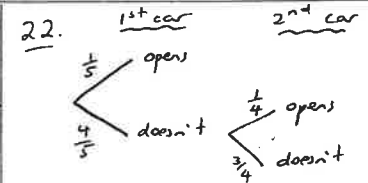
$A = \frac{1}{2}(a+b)$
= $\frac{35}{2}(52+16)$
= 1190 m² (C)

19. $\frac{x-2}{3} + 4 = \frac{x}{5}$

$\times 15: \frac{15x-30}{3} + 60 = \frac{15x}{5}$
 $5x - 10 + 60 = 3x$
 $2x = -50$
 $x = -25$ (A)

20. $n = 25 \times 12$
 $I\% = 9 \div 12$ (A)
 $PV = 50,000$
 $PMT = ?$ $\therefore PMT = \$419.60$
 $FV = 0$

21. Average cost lower \therefore mean decreases
Range increased \therefore sd increases (B)



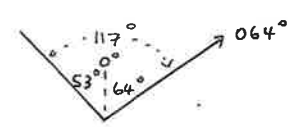
$P(\text{opens second}) = \frac{1}{5} \times \frac{1}{4}$
= $\frac{1}{5}$ (D)

MC Comments/Hints:

* Make sure you read the whole question carefully eg Quc 2 does it say find compound interest or the total amount.

* Watch your time!!
max of 30 mins.

QUESTION 23: (13 marks)	Comments/Hints
(a) $SA = 4\pi r^2$ $= 4 \times \pi \times 12^2$ ✓ $= 1809.557\dots$ $\hat{=} 1809.6 \text{ cm}^2$ ✓ correct rounding.	Meas 2
(b) (i) Duayne's score is 1.2 sd's below the mean ✓✓ (ii) $z = \frac{x - \bar{x}}{s}$ $1.5 = \frac{x - 24}{6}$ $\therefore x = 33$ ✓	Com 1/2 DA 3
(c) (i) 13, 17, 21 ✓ (ii) $s = 4n - 3$ ✓✓ (iii) $s = 4 \times 300 - 3$ $= 1197$ ✓	AM 4
(d) (i) 8.06 ✓ $\text{Repayment} = 400 \times 8.06$ $= \$3224$ ✓ (ii) $\$3224 \times 20 \times 12$ $= \$773,760$ ✓ $\therefore \text{Interest} = \$773,760 - 400,000$ $= \$373,760$ ✓	FM 14 NB You must use the table if directed to in the question.

QUESTION 24: (13 marks)	Comments/Hints
(a) $A_1 = \frac{5}{3} (8 + 4 \times 6.5 + 4 \times 5)$ $= 64.2$ ✓ $A_2 = \frac{5}{3} (4.5 + 4 \times 3 + 0)$ $= 27.5$ ✓ $\therefore \text{Total area} = 92 \text{ m}^2$ ✓	M 3
(b) (i) $\bar{x} = 18.9$ ✓ $\text{med} = 16$ ✓✓ $\text{mode} = 14$ $\text{IQR} = 15$ $\sigma_n = 9.26$ (ii) She should choose Toolan's Tours. The average time is shorter and there is less diversity in the times, so Toolan's Tours is consistently regarding shorter times ✓✓	DA 5 Students who made 1 error lost 1 mark. Students who made 2 errors received no marks.
(c) F.E. = $(\frac{1}{4} \times 5) + (\frac{1}{2} \times 1) - (\frac{1}{4} \times 6)$ $= \$0.25c$ ✓	Com 3 Must have 3 correct statements for 3 marks. Incorrect conclusion could have been supported for 2 marks. Must have discussed at least 1 measure of spread and 1 measure of location to get full marks. PB 1/2 One mark was given for correct probabilities.
(d) (i) $A = \frac{1}{2} \times 68 \times 95 \times \sin 52$ ✓ $= 2545.3 \text{ m}^2$ ✓ (ii)  $\therefore \text{Bearing is } 307^\circ$ ✓ (or N53°W)	M 3

QUESTION 25: (13 marks)

Comments / Hints

- (a) (i) January ✓
- (ii) Her statement is not valid.
For 11 of the 12 months of the year Berrigan's average monthly temperature is greater than or equal to Wagga's. ✓

DA 3

was well done!

Com 2

- (b) (i)

	Test indicated a lie	Test did not indicate a lie
Teenagers who lied	40	8
Teenagers who did NOT lie	23	109 ✓
	63	117

PB 5

(ii) $\frac{149}{180} \times 100 = 83\%$ ✓

(iii) $\frac{8}{48} = \frac{1}{6}$ ✓

Some careless numerical errors in this part.

- (c) (i) See graph over.

- median (50, 55) ✓
- correct line ✓

(ii) grad = $-\frac{48}{60} = -0.8$ ✓

y int = 90

$y = -0.8x + 90$ ✓

- (iii) (moderate) negative correlation ✓

DA 5

Make sure that you find the median, not the mean of the scores.

Accepted: gradient: 0.74 → 0.86

y int: 88 → 92

(It's not really weak...)

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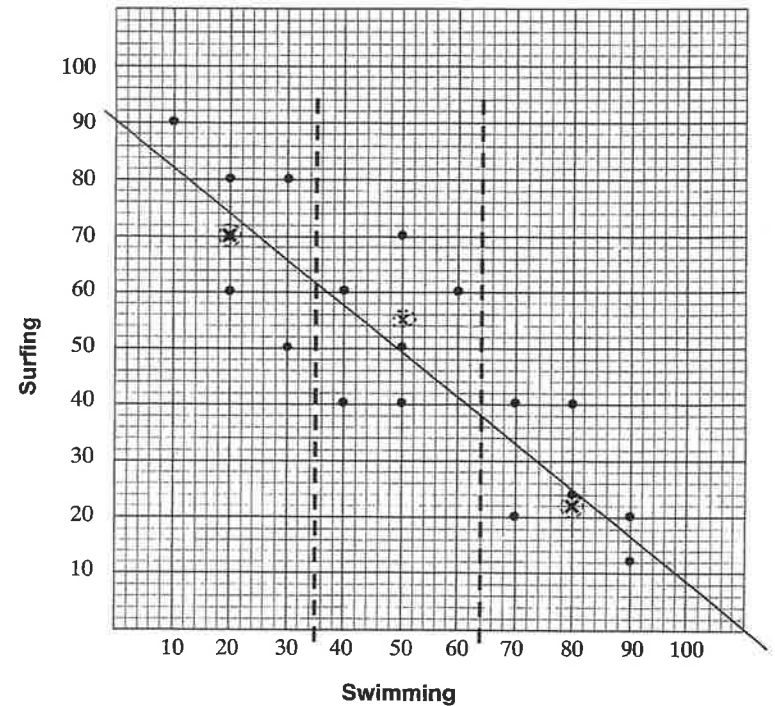
Centre Number

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Student Number

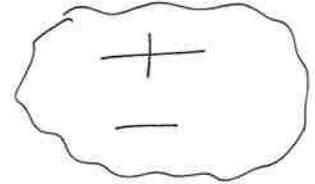
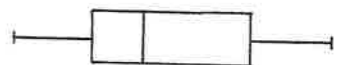
This page is to be detached, completed and handed in with the rest of your answers for Question 25.

Question 25 (c)



* median summary point

QUESTION 26 : (13 marks)	Comments / Hints
<p>(a) $110\% = \\$4246$ $\therefore 10\% = \\$386.60$ $\therefore 10\% = \\$386$ ✓</p> <p>(b) $S = V_0(1-r)^n$ $= 4246(1-0.02)^3$ ✓ $= \\$3996.30$ ✓</p>	<p>FM 5 Read question carefully - not asking for pre-GST price. simply asking for amount of GST. Generally well done</p>
<p>(c) $S = V_0(1-r)^n$ $= 4246(1-0.02)^4$ $= \\$3916.38$ ✓</p> <p>\therefore Tax deduction = $\\$79.92$ ✓</p>	<p>Only a few candidates got this correct. The tax deduction claimable is the depreciation <u>in the 4th year</u> - not the salvage value after 4 years.</p>
<p>(d) $\frac{1.5}{182} = \frac{2.2}{x}$ ✓ $\therefore x = 267m$ ✓</p>	<p>M 8 Solution also possible using trigonometry. A little longer and more likely to make errors.</p>
<p>(e) Bowl = $\frac{1}{2} \times \frac{4}{3} \pi r^3$ $= \frac{1}{2} \times \frac{4}{3} \times \pi \times 1^3$ $= 2.1m^3$ ✓</p> <p>Stand = $\pi r^2 h$ $= \pi \times 0.2^2 \times 1.2$ $= 0.15m^3$ ✓</p> <p>\therefore Total volume = $2.25m^3$ ✓</p>	
<p>(f) $1527L = 1.527m^3$ ✓ $1.527 = \frac{1}{2} \times \frac{4}{3} \pi r^3$ $\therefore r = 0.9m$ ✓ \therefore Thickness = $0.1m$ ✓</p>	<p>Only a few students could make the necessary connections - some saw an annulus which was not helpful in the case of a sphere.</p>

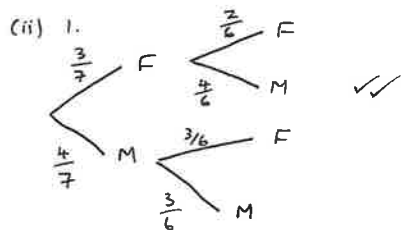
QUESTION 27 : (13 marks)	Comments / Hints
<p>(a) (i) 15 million megalitres ✓ (ii) 2002 \Rightarrow 12 million megalitres ✓ $\therefore \% = \frac{3}{15} \times 100$ $= 20\%$ ✓</p>	<p>DA 3 Well done.</p>
<p>(b) (i) $C = 5 + 2L^2$ $C - 5 = 2L^2$ $\frac{C-5}{2} = L^2$ ✓ $\therefore L = \pm \sqrt{\frac{C-5}{2}}$ ✓</p> <p>(ii) $20 = 5 + 2L^2$ $15 = 2L^2$ ✓ $7.5 = L^2$ $\therefore L = \pm 2.74$ ✓</p>	<p>AM 14</p> 
<p>(c) (i)  ✓✓</p> <p>(ii) positively skewed ✓</p>	<p>DA 3 use a ruler and measure carefully!</p>
<p>(d) $\cos \theta = \frac{10^2 + 18^2 - 12^2}{2 \times 10 \times 18}$ ✓ $\therefore \theta = 38.942\dots$ ✓ \therefore Bearing = $321^\circ 03'$ ✓ (or $N 38^\circ 57' W$)</p>	<p>M 13 * Some students find the wrong angle in the triangle. * Also make sure that you go ahead and find the bearing, not just the angle. NB Qn says answer to the nearest <u>minute</u>.</p>

QUESTION 28: (13 marks)

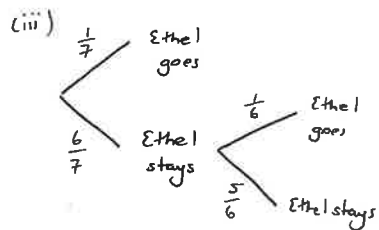
Comment/Hints

(a) Angle = 18° ✓
 and $1^\circ = 60nM$
 \therefore Dist. = 18×60 ✓
 = $1080nM$ ✓

(b) (i) $\frac{4}{7}$ ✓



2. $(\frac{3}{7} \times \frac{4}{6}) + (\frac{4}{7} \times \frac{3}{6})$ ✓
 = $\frac{4}{7}$ ✓



$\therefore P(\text{Ethel stays}) = \frac{6}{7} \times \frac{5}{6}$ ✓
 = $\frac{5}{7}$ ✓

\therefore Ethel does have a better than even chance of staying in the house. ✓

(M12) A similar answer could have been obtained using $l = \frac{Q \times 2 \times \pi \times r}{360}$
 - conversion should have been known.

(P6/7)

Several students did not reduce the diameter to 6.

Reasonably well done but several students incorrectly found P(at least one female) instead of exactly one female.

Intuitively, if there are 7 people and 2 evictees, then the chance of staying is $\frac{5}{7}$.

Some students considered the chance of being evicted rather than the chance of remaining.

(Com 2)

(c) Bank NSW

$n = 10 \times 12$
 $I\% = 5.5 \div 12$
 $PV = 1000000$
 $PMT = 0$
 $FV = ?$ $FV = \$1,731,076$ ✓
 which is not enough. ✓

Sydney Savings

$n = 10 \times 4$
 $I\% = 5.8 \div 4$
 $PV = 1000000$
 $PMT = 0$
 $FV = ?$ $FV = \$1,778,615$ ✓

\therefore Ethel should choose Sydney Savings as it is the only one which will give her the 1.75 million to release her CO!

(FM 1/4)

Quite well done
 - Must be careful to be clear in communication.
 - Some responses were not adequate.

(Com 4)