

Name: _____

Teacher: _____



PYMBLE LADIES' COLLEGE

Year 12 General Mathematics

Trial Higher School Certificate 2004

GENERAL INSTRUCTIONS

Reading Time: 5 minutes

Working Time 2.5 hrs

- Write using blue or black pen
- All necessary working should be shown in Section 2
- Marks may be deducted for careless or badly arranged work
- Approved graphics calculators should be used
- Mathematics templates and geometrical instruments may be used
- Write your name on every sheet of paper used in Section 2
- Answer multiple choice questions (1–22) on a sheet provided
- Staple each question (23–28) separately
- A formulae sheet is provided at the back of this paper

TOTAL MARKS – 100

Section 1

(22 marks)

22 multiple choice questions

mark answers on Answer Sheet provided

Section 2

(78 marks)

Questions 23–28

each question is worth 13 marks

start each question on a new page

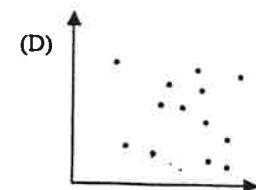
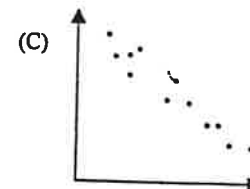
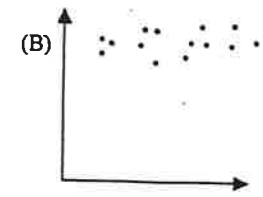
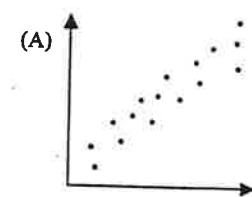
Question 1

Total marks (22)

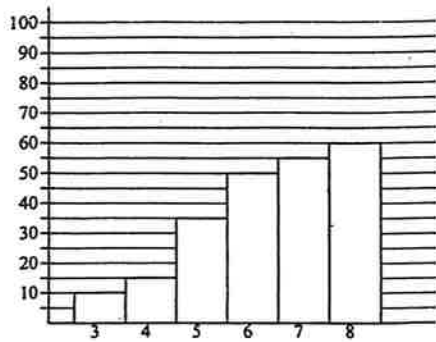
Attempt all questions 1 – 22

Allow about 30 minutes for this section

- 1 0.001027 431 correct to 3 significant figures is?
- (A) 0.001
(B) 0.00102
(C) 0.00103
(D) 0.001027
- 2 A boy's height is 154cm. The percentage error, to 1 significant figure, given the tape measure used to measure the boy is graduated in centimetres, is:
- (A) 0.003% (B) 0.3% (C) 0.5% (D) 5.0%
- 3 Sam wishes to survey the students in his school to suggest changes to the Canteen menu. He decides to give the survey to 10% of the students in each year group at the school. What type of sampling is this?
- (A) Stratified
(B) Random
(C) Systematic
(D) Census
- 4 Which of the graphics below shows a high negative correlation?

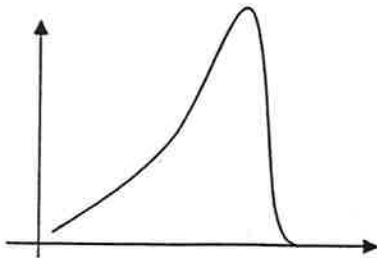


5 From the following cumulative frequency diagram, the first quartile is:



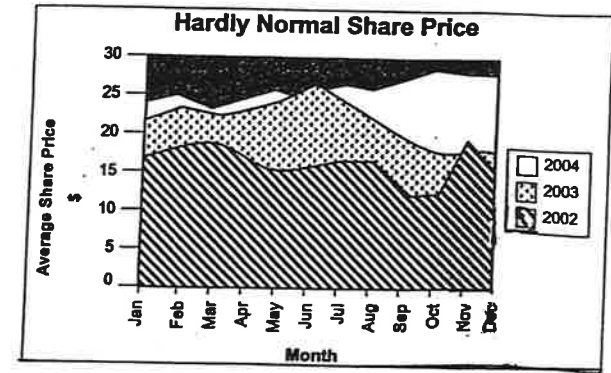
- (A) 4.5
- (B) 4
- (C) 5.2
- (D) 5

6 The following graph is:



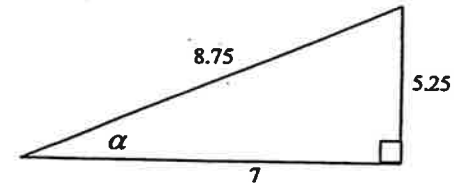
- (A) Negative skew
- (B) Normal
- (C) Symmetrical
- (D) Positive skew

7 In which month in 2002 was the Hardly Normal average share price higher than the same month in 2003?



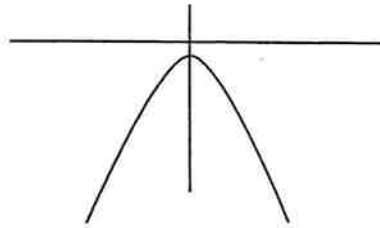
- (A) March
- (B) May
- (C) June
- (D) November

8 In the following right-triangle, find $\cos \alpha$



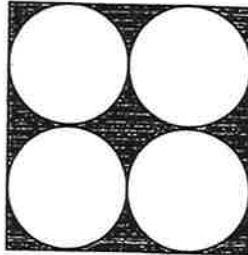
- (A) 53.1
- (B) 1.7
- (C) 0.6
- (D) 0.8

- 9 Which equation below could be represented by the graph?

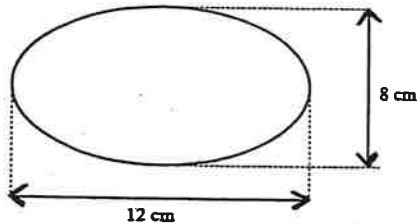


- (A) $y = -x^2 - 1$
 (B) $y = -x^2 + 1$
 (C) $y = x^2 - 1$
 (D) $y = x^2 + 1$
- 10 From the diagram, find the area of the shaded region to the nearest square centimetre if each of the circles has a diameter of 6cm

- (A) 31 cm^2
 (B) 69 cm^2
 (C) 77 cm^2
 (D) 89 cm^2

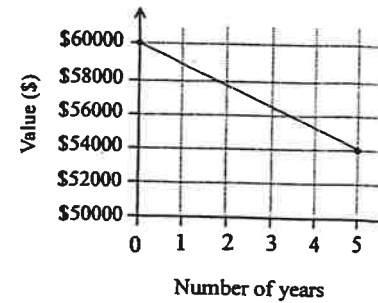


- 11 Which of the following expressions will correctly give the area of the ellipse drawn below?



- (A) $\pi \times 10^2$ (B) $\pi \times 12 \times 8$ (C) $\pi \times 5^2$ (D) $\pi \times 6 \times 4$

- 12 Peter bought a sports car for \$60 000. The graph shows the value of the car over 5 years. By what percentage of the original price did the car depreciate each year?

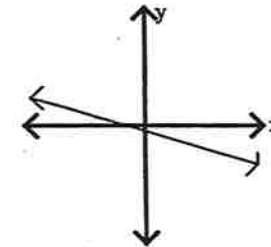


- A) 10% B) 5%
 C) 20% D) 2%

- 13 Nick bought 200 two dollar shares in Woolworths and paid \$780 in total for them. The dividend yield on the shares is 6.2%. The dividend per share (to the nearest cent) is:

- (A) 12c
 (B) 24c
 (C) 50c
 (D) 53c

- 14 Consider the linear function drawn below



The gradient of the function would be closest to

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

- 15 The two lines $y = 2x - 1$ and $y = 5 - 4x$ intersect at the point:

- (A) (0,5) (B) (0,-1) (C) (1,1) (D) (1,-1)

16 Make r the subject of $s = \frac{a}{1-r}$

(A) $r = a - s$

(B) $r = s - a$

(C) $r = \frac{a-s}{s}$

(D) $r = \frac{s-a}{s}$

17 A picture frame is shown. The frame has a width of 4cm and the picture is 12cm by 18cm



not to scale

An expression for the shaded area of the frame is

(A) $(18+4)(12+4)$

(B) $(18+8)(12+8)$

(C) $22 \times 16 - 18 \times 12$

(D) $26 \times 20 - 18 \times 12$

18 Maria was required to solve an equation for homework. This was her solution.

$8 - 4(3x - 7) = 16$

$8 - 12x + 28 = 16$ Line 1

$-12x - 20 = 16$ Line 2

$-12x = 36$ Line 3

$x = 3$ Line 4

Which lines DO NOT follow correctly from the previous line?

(A) Line 1 and Line 2

(B) Line 1 and Line 4

(C) Line 2 and Line 3

(D) Line 2 and Line 4

19 The fishing authorities are concerned about the number of fish in a certain lake. To investigate this, they use the "capture-recapture" method. They capture 70 fish, tag and release them. The following day they return and take a sample of 20 fish from the lake, noting that 3 of these are tagged.

Estimate the number of fish in the lake.

(A) 93 (B) 210 (C) 467 (D) 4200

20 A scale drawing of a block of land is drawn with a length of 12cm and a width of 15cm. The actual length of the block of land is 66m. The actual width of the block is:

(A) 69m (B) 75m (C) 82.5m (D) 121m

21 The Customs Department uses sniffer dogs to detect the presence of prohibited substances in people's luggage. Rover is a trainee sniffer dog and he is tested on 100 pieces of luggage. The results of Rover's test are displayed in the two-way table below.

	Test Results		TOTAL
	Accurate	Not accurate	
With prohibited substances	8	2	10
Without prohibited substances	87	3	90
TOTAL	95	5	

Based on the above table, what percentage of luggage with prohibited substances is detected by Rover?

(A) 10% (B) 80% (C) 90% (D) 95%

22 The number of rabbits in Bush Island is increasing according to the formula $N = 3000 \times 2^{0.6t}$, where t is the time in years after 1 August 2000 and N is the number of rabbits present at time t .

Compared with those at 1 August 2000, how many more rabbits will be expected on Bush Island on 1 August 2010?

(A) 192 000 (B) 189 000 (C) 36 00 (D) $6^6 \times 10^{18}$

END OF SECTION 1

SECTION II

Total Marks 78

Attempt Questions 23-28

Write all answers on the paper provided

Question 23

(13 marks)

- a) i) Using the following notebook entry draw the offset survey using a scale of 1:1000 (1cm=10m)

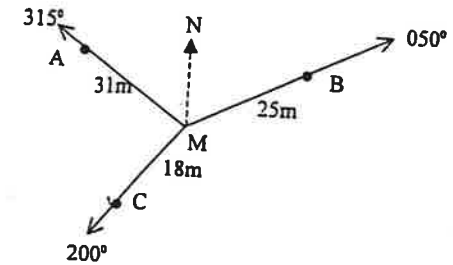
	B	
	30	
	23	17 D
C 8	18	
	12	10 E
	A	

(2)

- ii) By measurement or otherwise, find the length AC (nearest metre) (1)

- iii) Calculate the area of the quadrilateral ABDE (2)

- b) Tarquin used the following radial survey



- i) Calculate the size of $\angle AMC$ (1)

- ii) Find the area of $\triangle AMC$ to the nearest square metre (2)

- c) A Pymble girl leaves Perth ($32^{\circ}\text{S}, 120^{\circ}\text{E}$) by plane on a 10 hour flight to Cape Town ($33^{\circ}\text{S}, 15^{\circ}\text{E}$) at 6pm Monday

- i) What is the time difference between Perth and Cape Town? (1)

- ii) What time is it in Cape Town when the plane leaves Perth? (1)

- iii) When does the plane arrive in Cape Town? (1)

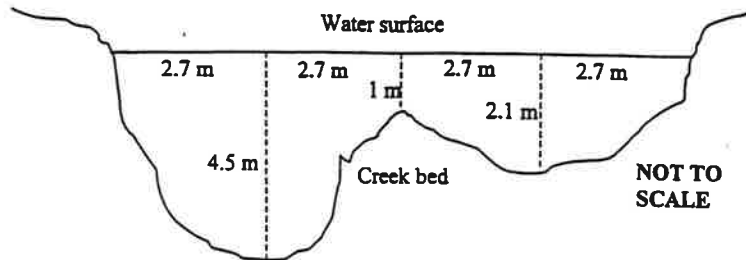
- d) Calculate the distance in nautical miles, between K($30^{\circ}\text{N}, 150^{\circ}\text{E}$) and W($10^{\circ}\text{S}, 150^{\circ}\text{E}$) (2)

END OF QUESTION 23

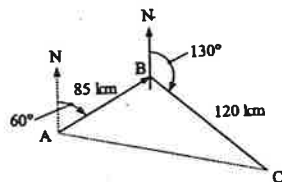
Question 24 (Start a new page)

(13 marks)

- a) The diagram shows a vertical cross-section of a creek. The depth of the creek was measured every 2.7m.



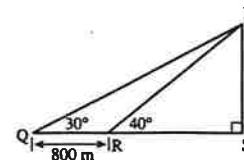
- i) Using Simpson's Rule twice, calculate an approximate area of this cross-section of the creek (2)
- ii) Assume the length of the creek is 110m with the same approximate cross-section as above. Estimate the volume of water in the creek, to the nearest 100 cubic metres (1)
- b) A ship sails 85km from A to B on a bearing of 060° T. It then turns and sails 120km to C on a bearing of 130° T



- i) Show that the size of $\angle ABC$ is 110° (1)
- ii) Using the cosine rule, how far is the ship from its starting point? Answer correct to the nearest metre. (2)
- iii) Calculate $\angle BAC$ using the sine rule. Answer to the nearest degree. (2)
- iv) What is the bearing of the ship from its starting point? (1)

QUESTION 24 CONTINUES ON NEXT PAGE

- c) Use the diagram below to answer the following questions



- i) Show that the length of PR is approximately 2304 m. (2)
- ii) Calculate the length of PS to the nearest metre (2)

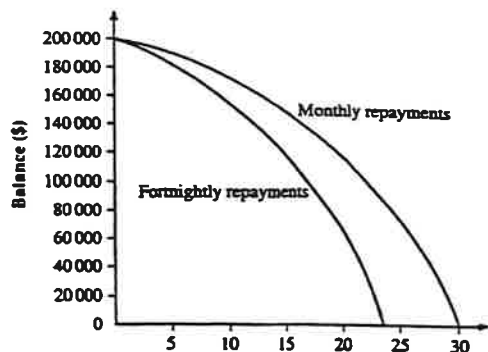
END OF QUESTION 24

Question 25 (Start a new page)

(13 marks)

- a) The graph compares the progress of a \$200 000 loan when repayments are made monthly and fortnightly.

Reducing Balance loan (interest 6.7% p.a)



- i) Estimate the amount owing on the loan after 20 years, if repayments are made monthly (1)
- ii) Estimate the number of years required to reduce the loan by half, if repayments are made fortnightly (1)
- iii) What is the benefit of paying fortnightly instead of monthly? Explain why this is the case. (2)

QUESTION 25 CONTINUES ON NEXT PAGE

- b) The following table shows the value of \$1 after various time periods and interest rates

Period	Interest rate per period						
	3%	5%	6%	10%	12%	15%	20%
1	1.030	1.050	1.060	1.100	1.120	1.150	1.200
2	1.061	1.103	1.124	1.210	1.254	1.323	1.440
3	1.093	1.158	1.191	1.331	1.405	1.521	1.728
4	1.126	1.216	1.262	1.461	1.574	1.750	2.074
5	1.159	1.276	1.338	1.611	1.762	2.011	2.488
6	1.194	1.340	1.419	1.772	1.974	2.313	2.986
7	1.230	1.407	1.504	1.949	2.211	2.660	3.583
10	1.344	1.629	1.791	2.594	3.106	4.045	6.192
12	1.426	1.796	2.012	3.138	3.896	5.350	8.916

- i) How much will an investment of \$2 000 be worth in 5 years time if it is invested at 6% per annum, compounding yearly (1)
 - ii) What will be the future value of \$4 600 after 3 years when it is invested at 12% per annum, compounding quarterly? (2)
 - iii) How much do I need to invest today (i.e what is the present value) to give me a future value of \$7 067.20 after 2 years, if the interest rate is 12%, compounding six monthly? (2)
- c) Sylvester earns \$24.00 per hour for a normal 7 hour day while working at "Happy Rooster". He receives one and a half times the normal rate for the first 2 hours of overtime and double time thereafter. Sylvester worked for 13½ hours at "Happy Rooster" last Friday. How much was he paid for working last Friday? (3)
- d) A television costs \$902, including 10% GST. Calculate the value of the GST (1)

END OF QUESTION 25

Question 26 (Start a new page)

(13 marks)

- a) The life of batteries, in hours, manufactured by the Everlife Company are normally distributed to meet Australian standards. The mean life of the batteries from this company is stated as 220 hours with a standard deviation of 25 hours.
- From a box of 5 000 batteries from this company, approximately how many would be expected to have a life of between 170 hours and 270 hours (1)
 - Comment on whether it is likely that batteries selected from a box from this company would have a life of more than 295 hours. (1)
- b) In a fishing competition, 20 fishermen fished off the beach at Terrigal and 20 fishermen fished off the beach at Avoca. The number of fish caught by each person in each location is recorded in this back to back Stem and Leaf Plot.

Terrigal		Avoca
9 9 9 8 8	1	1 2 6
9 9 8 8 8 5 3	2	1 1 2 3
9 9 9 9 9 8 4	3	1 1 1 2 3 3 4 9
□	4	1 1 2 2 3

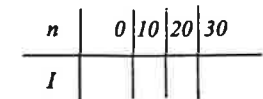
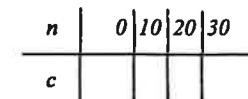
- If the range of fish caught off the beach in Terrigal was 31, what number would be represented by □ ? (1)
- Determine the mean and standard deviation of fish caught off the beach in Avoca (to the nearest whole number). (2)
- The following were calculated for the number of fish caught off the beach in Terrigal (to the nearest whole number).

Mean: 30 Standard Deviation: 9

By comparing and contrasting these results with those from part ii), which beach would you recommend for maximising your catch? Why? (2)

- c) The initial cost of making Mathematics ties is \$140 and each tie will cost an extra \$20 to produce. The Mathematics Department will sell the ties for \$25 each.

- Complete the expression for total cost (c) of producing n ties
 $c = 140 + \text{_____}$ (1)
- Complete the expression for the Income (I) for selling n ties
 $I = \text{_____}$ (1)
- Use the graph paper on page 22 to graph the total cost (c) and Income (I) for n ties (2)



- Use the graphs in part iii) determine how many ties need to be sold to break even. (1)
- If 1200 ties are sold, how much profit does the Mathematics Department make? (1)

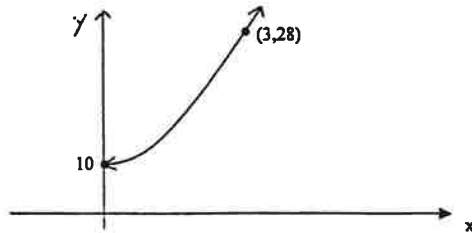
END OF QUESTION 26

QUESTION 26 CONTINUES ON NEXT PAGE

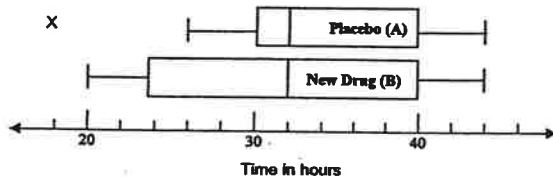
Question 27 (Start a new page)

(13 marks)

- a) It takes 50 workers in a factory 14 days to make 1 000 video recorders. Given that the time required to make the video recorders is inversely proportional to the number of workers doing the job, find the number of workers required to finish the job in 10 days. (3)
- b) The amount (A) of caffeine left in the blood t hours after consuming food or drink containing caffeine can be calculated using the formula $A = Q(0.84)^t$ where Q is the original amount of caffeine consumed in mg and t is the number of hours after consuming the caffeine. Cathy drinks a whole bottle of coke containing 60mg of caffeine at 11am, how much of the caffeine will be in her blood at 4pm the same day? (answer to the nearest mg) (2)
- c) For the following graph $y = ax^2 + b$, find the values of a and b (2)



- d) A pharmaceutical company is trialling a new drug. They gave 20 volunteers the drug to help relieve their symptoms and a further 20 volunteers received a placebo (which did nothing medically to relieve their symptoms). Volunteers were unaware whether they received the drug or placebo and they were asked to record the time that elapsed between the time they took their pill and the time they felt better. These are the results



- i) Explain why a time of 18 hours has been marked with an x on the box and whisker plot for the Placebo (A) (1)
- ii) Find the Interquartile range of the Placebo (A) and the New Drug (B) (2)
- iii) Comment on the overall effect of the New Drug (B) (1)

QUESTION 27 CONTINUES ON NEXT PAGE

- e) A survey of people in randomly selected court cases showed the following results

	Convicted	Acquitted	
Innocent	3	14	17
Guilty	28	5	33
	31	19	

- i) How many people were surveyed? (1)
- ii) What percentage (1 significant figure) of those convicted were innocent? (1)

END OF QUESTION 27

Question 28 (Start a new page)

(13 marks)

- a) Doris works in a law office and receives \$3 150 per fortnight. She also earns \$6 120 per annum from share dividends. Her allowable tax deductions (work related expenses) for the year amount to \$4 350.

Throughout the year she pays \$27 850 in PAYE tax.

- i) Calculate her taxable income (1)
- ii) Use the table below to calculate how much tax Doris should pay for the financial year. Is she entitled to a refund from the Taxation Department? (2)

Taxable Income	Tax
\$0-\$6000	NIL
\$6000-\$20 000	NIL plus 17 cents for each \$1 over \$6000
\$20 000-\$50 000	\$2380 plus 30 cents for each \$1 over \$20 000
\$50 001-\$60 000	\$11 380 plus 42 cents for each \$1 over \$50 000
\$60 001 and over	\$15 580 plus 47 cents for each \$1 over \$60 000

b) Solve for x : $\frac{x+3}{4} - \frac{x-2}{5} = 1$ (2)

- c) A sphere with a radius of 2.5m is full of water. All the water drains into a rectangular prism with the base having the dimensions 1.8m x 4.3m. Find how far, to the nearest metre, the water will rise. Show all working. (2)

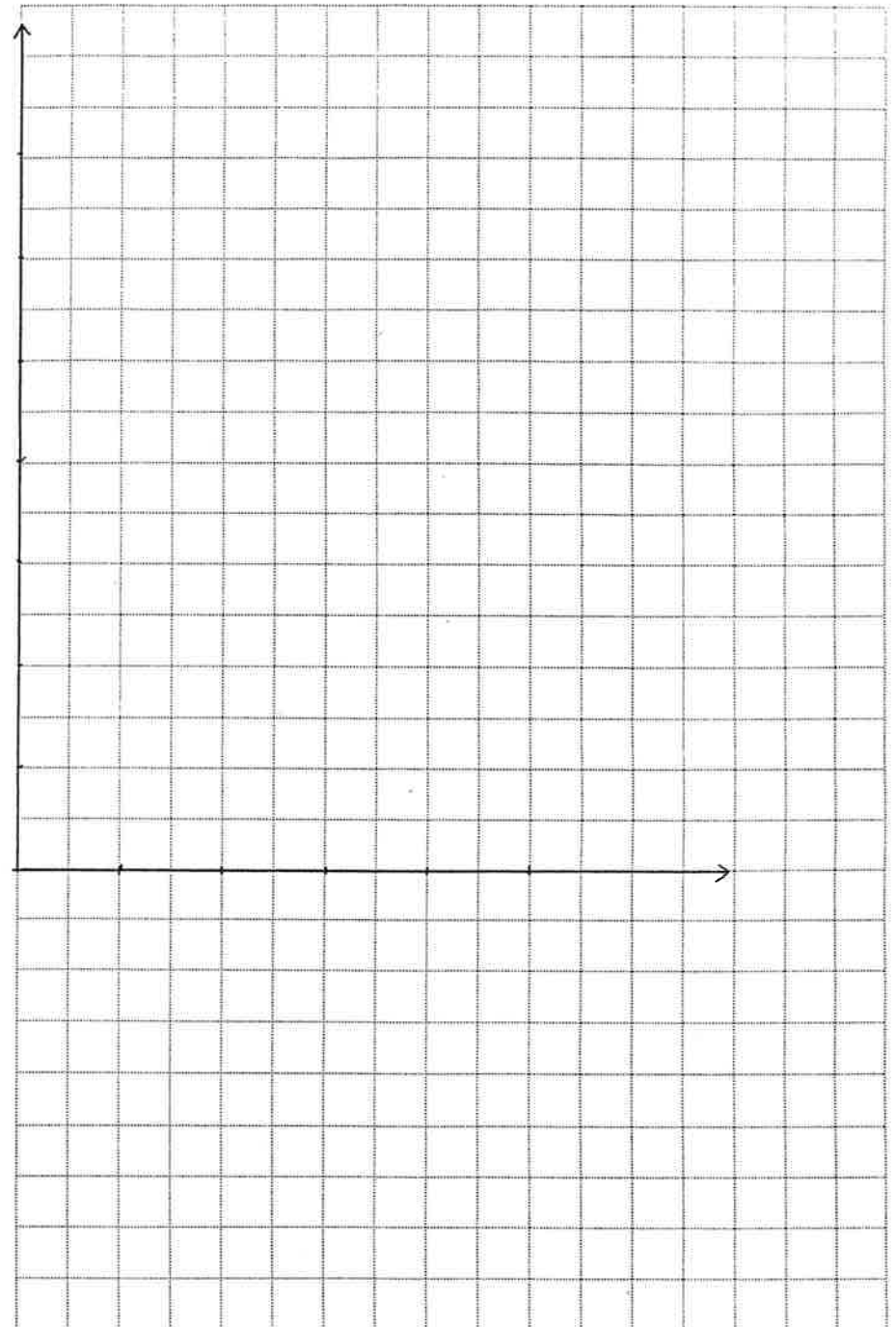
- d) Joanne and Amanda both want to go on a holiday around the world in 5 years time. They estimate that each would need at least \$40 000 to pay for the holiday.

Joanne decides to invest \$580 at the end of each month into an account that pays 6% per annum, compounded monthly, while Amanda chooses to invest \$M at the end of each year into an account that pays 6.2% per annum, compounded annually.

- i) How much will Joanne invest in total into her account? (1)
- ii) Will she have enough money in 5 years time to go on this holiday? Give reasons (2)
- iii) Find \$M, the least amount that Amanda needs to invest each year to go on this holiday. (2)
- iv) Joanne and Amanda invested their money over the same period of time. Why did Amanda need to invest more than Joanne to be able to go on this holiday? (1)

End of paper

Name:



Formulae Sheet

<p>Area of an ellipse</p> $A = \pi ab$ <p>a = length of semi major axis b = length of semi minor axis</p> <p>Simpson's rule for area approximation</p> $A \approx \frac{h}{3}(d_r + 4d_m + d_l)$ <p>h = distance between successive measurements d_r = first measurement d_m = middle measurement d_l = last measurement</p> <p>Area of a sector</p> $A = \frac{\theta}{360} \pi r^2$ <p>θ = number of degrees in central angle</p> <p>Arc length of a circle</p> $l = \frac{\theta}{360} 2\pi r$ <p>θ = number of degrees in central angle</p> <p>Area of an annulus</p> $A = \pi (R^2 - r^2)$ <p>R = radius of outer circle r = radius of inner circle</p> <p>Surface area of a sphere</p> $A = 4\pi r^2$	<p>Volume</p> <p>Cone $V = \frac{1}{3} \pi r^2 h$</p> <p>Cylinder $V = \pi r^2 h$</p> <p>Pyramid $V = \frac{1}{3} Ah$</p> <p>Sphere $V = \frac{4}{3} \pi r^3$</p> <p>A = area of base h = perpendicular height</p> <p>Formula for z-scores</p> $z = \frac{x - \bar{x}}{s}$ <p>s = standard deviation</p> <p>Probability of an event</p> <p>The probability of an event where outcomes are equally likely is given by:</p> $P(\text{event}) = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$ <p>Mean of a distribution</p> $\bar{x} = \frac{\sum x}{n}$ $\bar{x} = \frac{\sum fx}{\sum f}$ <p>x = individual score x̄ = mean</p>
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<p>Simple interest</p> $I = Pm$ <p>P = initial quantity r = percentage interest rate per period expressed as a decimal n = number of periods</p> <p>Present value (N) of an annuity</p> $N = M \left\{ \frac{(1+r)^n - 1}{r(1+r)^n} \right\}$ <p>or</p> $N = \frac{A}{(1+r)^n}$ <p>Future value (A) of an annuity</p> $A = M \left\{ \frac{(1+r)^n - 1}{r} \right\}$ <p>M = contribution per period, paid at the end of the period</p> <p>Compound interest</p> $A = P(1+r)^n$ <p>A = final balance P = initial quantity n = number of compounding periods r = percentage interest rate per compounding period expressed as a decimal</p> <p>Straight-line formula for depreciation</p> $S = V_0 - Dn$ <p>S = salvage value of asset after n periods V₀ = purchase price of the asset D = amount of depreciation apportioned per period n = number of periods</p>	<p>Gradient intercept form of straight line</p> $y = mx + b$ <p>m = gradient b = y intercept</p> <p>Gradient of a straight line</p> $m = \frac{\text{vertical change in position}}{\text{horizontal change in position}}$ <p>Declining balance formula for depreciation</p> $S = V_0 (1-r)^n$ <p>S = salvage value of asset after n periods r = percentage interest rate per period, expressed as a decimal</p> <p>Sine rule</p> $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ <p>Area of a triangle</p> $A = \frac{1}{2} ab \sin C$ <p>Cosine rule</p> $c^2 = a^2 + b^2 - 2ab \cos C$ <p>or</p> $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$
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Name SIR

Student Number Answers

Section 1

General Mathematics
Trial HSC Examination 2004

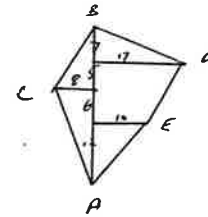
Multiple Choice Answer Sheet

Completely fill the response oval representing the most correct answer

- | | | | | | | | | |
|----|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|
| 1 | A | <input type="radio"/> | B | <input type="radio"/> | C | <input checked="" type="radio"/> | D | <input type="radio"/> |
| 2 | A | <input type="radio"/> | B | <input checked="" type="radio"/> | C | <input type="radio"/> | D | <input type="radio"/> |
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| 20 | A | <input type="radio"/> | B | <input type="radio"/> | C | <input checked="" type="radio"/> | D | <input type="radio"/> |
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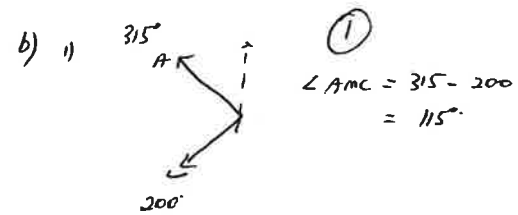
23

c) "

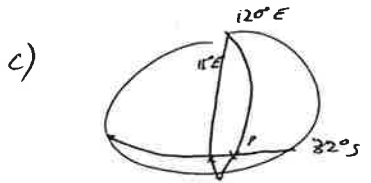


$AC^2 = 9^2 + 18^2$
 $AC = 19.6977...$
 ≈ 20

i) $A = \frac{1}{2} \times 7 \times 17 + \frac{1}{2} \times 11(17+10) + \frac{1}{2} \times 12 \times 10$
 $= 59.5 + 148.5 + 60$
 $= 268 \text{ m}^2$



ii) $A = \frac{1}{2} \times 31 \times 18 \times \sin 115$
 $= 252.8598...$
 $\approx 253 \text{ m}^2$



i) $= (120 - 15) \times 4$
 $= 420 \text{ min or } 7 \text{ hours}$

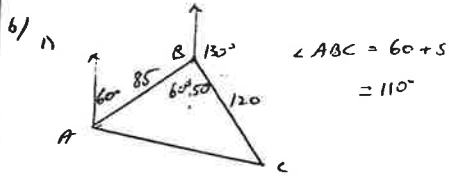
ii) 6 p.m Monday - 7 hour.
 11 a Monday

iii) 11 a + 10 hour
 9 p - Monday

d) Fine off = 40
 Distance = $40 \times 60 = 2400 \text{ nm}$

24 a) $\frac{1}{3}(y+4+4y)$
 $= \frac{2.7}{3}(0+1+4 \times 4.5) + \frac{2.7}{3}(1+1)$
 $= 17.1 + 8.46$
 $= 25.56 \text{ m}^2$

ii) $V = 25.56 \times 110$
 $= 2811.6 \text{ m}^3$
 $\approx 2800 \text{ m}^3$



ii) $AC^2 = 85^2 + 120^2 - 2 \times 85 \times 120 \times \cos 110$
 $= 28602.210...$
 $ac = 169.1218...$
 $\approx 169 \text{ km}$

iii) $\frac{\sin A}{a} = \frac{\sin 110}{120}$
 $\sin A = \frac{120 \sin 110}{169}$
 $A = 41.8541...$
 $\approx 42^\circ$

iv) $B = 60 + 42$
 $= 102^\circ$
 ie 102° T

c) "

i) $\frac{800}{\sin 10^\circ} = \frac{PR}{\sin 30^\circ}$
 $PR = \frac{800 \sin 30^\circ}{\sin 10^\circ}$
 $= 2303.5081...$
 $\approx 2304 \text{ m}$

ii) $\sin 40^\circ = \frac{PS}{2304}$ $PS = 1480.66$

- 25
- a) i) \$120,000 (1)
 ii) 17 years (1)
 iii) 2 extra payments made each.
 Therefore, more is paid + less interest paid (2)

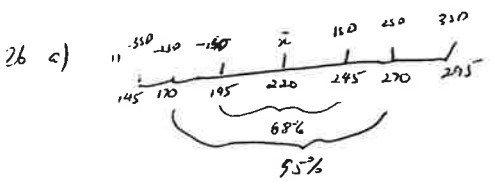
b) i) $A = 1.338 \times 2000 = \2676 (1)

ii) $A = 4600 \times 1.426 = \6559.60 (2)

iii) $7067.20 = x \times 1.262$
 $x = \$5600$ (3)

c) Wage = $7 \times 24 + 2 \times 12 \times 24 + \frac{1}{2} \times 2 \times 24$
 $= 168 + 72 + 216 = \$456$ (3)

d) $902 = \frac{110}{100} \times x$ or $110 \rightarrow 902$
 $x = \frac{902 \times 100}{110} = 820$
 $\therefore \text{GST} = \frac{10}{100} \times 820 = \82



95% (250)
 $\therefore \frac{95}{100} \times 5000 = 4750$ (1)

ii) Only 0.15% (+350) very unlikely. (4)

b) i) $\bar{x} = 9$ (1)
 ii) $\frac{\bar{x}}{s} = \frac{9}{10}$ (2)

iii) Tergel -- lower SD. (same \bar{x}). More consistent catch of Tergel. Scores more closely grouped around \bar{x} (2)

c) i) $C = 140 + 20n$ (1)

ii) $J = 25n$ (1)

iii)

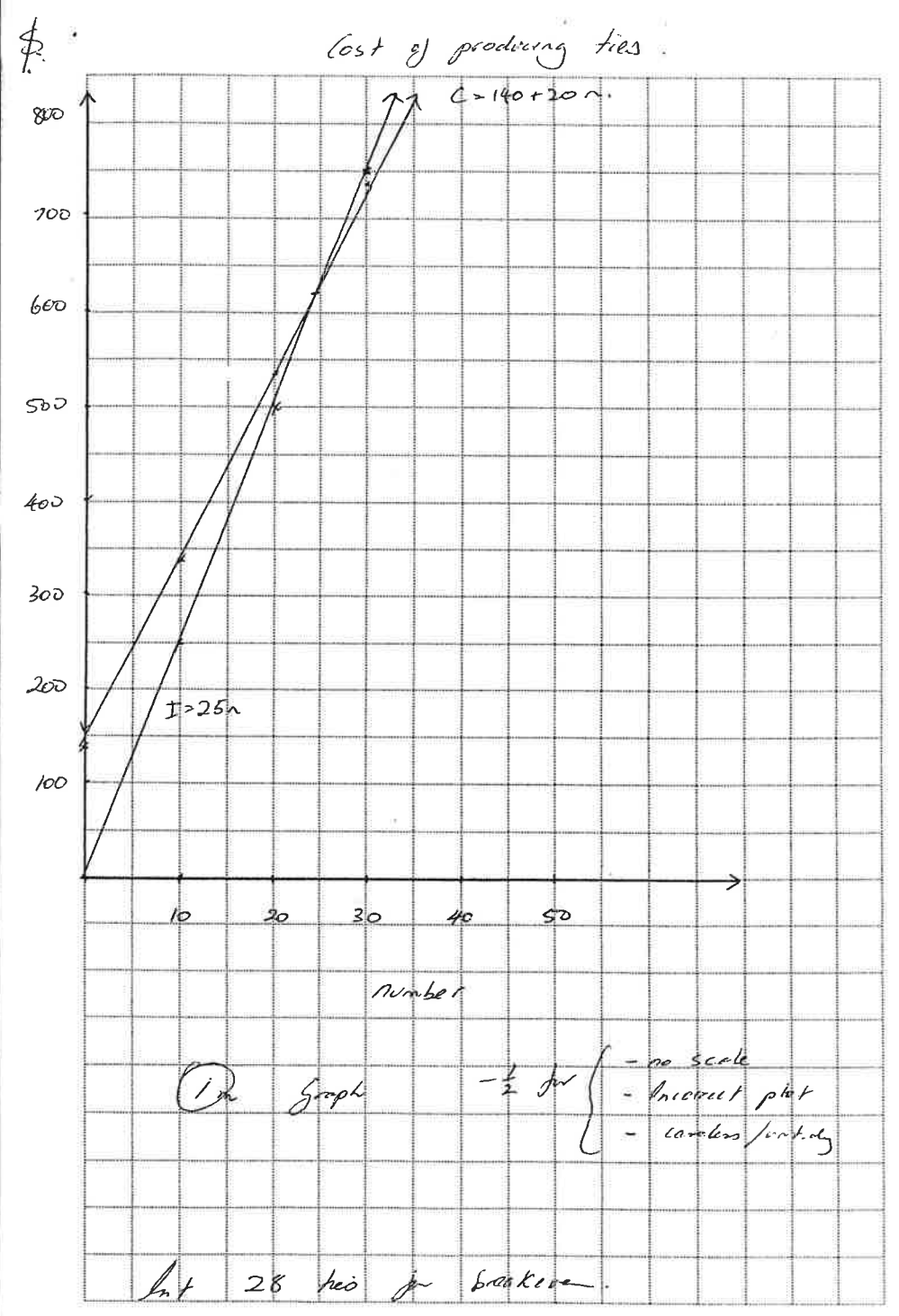
n	0	10	20	30
C	140	340	540	740

iv)

n	0	10	20	30
J	0	250	500	750

$\frac{1}{n}$ part mistake
 $\frac{1}{n}$ for graph
 $\frac{1}{n} = 28$ (1)

v) $P = 5 \times 1200 - 140 = \5860 (1)



27. a) $t \propto \frac{1}{w}$
 $t = \frac{k}{w}$
 $14 = \frac{k}{50}$
 $k = 700$

(3)

$t = \frac{700}{w}$
 $10 = \frac{700}{w}$
 $w = 70$

b) $A = 40(0.84)^t$
 $= 60(0.84)^5$
 $= 25.0927...$
 $\approx 25m$

(2)

c) $y = ax^2 + b$
 $28 = a \times 3^2 + b$
 $28 = 9a + b$
 $9a = 18$
 $a = 2$
 $\therefore a = 2$
 $b = 10$

(2)

d) i) Outlier score (more than 1.5 x IQR from Q1)

(1)

ii) IQR $A = 40 - 30 = 10$
 $B = 40 - 24 = 16$

(2)

iii) B had a significant effect on relieving symptoms in a relatively small number of individuals although the average time to reduce symptoms were identical.
 \therefore No real advantage.

(1)

e) i) 50
 ii) $\frac{3}{31} \times 100 = 9.6774...$
 $\approx 10\%$

(1)

(1)

28 a) $I = 26 \times 3150 + 6120$
 $= \$88020$

(1)

$= 88020 - 4350$
 $= 83670$

ii) $F = (83670 - 6000) \times 1.47 + 15580$
 $= 1112490 + 15580$
 $= \$1268070$

(2)

b) $\frac{x+3}{4} - \frac{x-2}{5} = 1$ YES
 $\frac{5x+15-4x+8}{20} = \frac{20}{20}$
 $x+23 = 20$
 $x = -3$

(2)

c) $S = \frac{4}{3}\pi r^3$
 $= \frac{4}{3}\pi \times 2.5^3$
 $= 65.4498... m^3$

(2)

$r = 16L$
 $65.4498... = 1.8 \times 4.3 \times L$
 $L = \frac{65.4498...}{1.8 \times 4.3}$
 $= 8.4560...$
 $\approx 8m$

d) i) $J = 580 \times 12 \times 5$
 $= \$34800$

(1)

ii) $FV = 11 \left\{ \frac{(1+r)^n - 1}{r} \right\}$
 $= 580 \left\{ \frac{(1+0.005)^{60} - 1}{0.005} \right\}$
 $= \$40466.62$
 Yes, earns \$4066.62 extra

(2)

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

(2)

$40000 = m \left\{ \frac{(1+0.062)^5 - 1}{0.062} \right\}$

$m = \frac{40000 \times 0.062}{(1+0.062)^5 - 1}$
 $= \$7067.58$

iv) Joanne invested \$6960 (580x12) per year compared to Amanda (7067.58)

(1)

Joanne's monthly deposited attracted monthly interest + consequently earn more interest relative to yearly interest rate of Amanda.