



Student Name/Number:

2002
PRELIMINARY COURSE
Sample Examination Paper

GENERAL MATHEMATICS

Reading time - 5 minutes
Working time - Two (2) hours

General Instructions

- The mark out of 80 will be converted to a mark out of 100
- Board approved calculators may be used

Section I - 20 marks
Attempt all questions
Mark your answers on the answer sheet provided Allow about 30 minutes for Section I

Section II - 60 marks
Attempt all questions
All questions are of equal value
Answer the questions in the space provided on this paper
Marks may be deducted for careless or badly arranged work
Show all necessary work
Allow about one and a half hours for Section II

Directions to School or College

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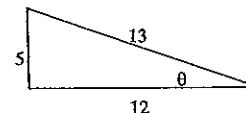
General Mathematics, Preliminary - 2002

SECTION I (20 marks)

1. Jamie does casual work. He is paid 12.5% commission on the sales he makes. If in one week he earns \$500 what was the value of his sales?

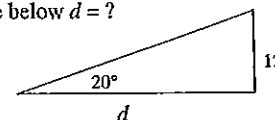
A. \$62.50 B. \$3937.50 C. \$4000 D. \$4062.50

2. From the triangle below $\sin\theta =$



A. $\frac{5}{12}$ B. $\frac{5}{13}$ C. $\frac{12}{13}$ D. $\frac{12}{5}$

3. In the triangle below $d = ?$



A. 33 B. 5 C. 0.36 D. 0.03

4. Tom is due for annual leave. His four weeks holiday pay will have a 17.5% loading added to it. If he earns \$42420 per year, how much extra will he get?

A. \$571 B. \$3263 C. \$3834 D. \$7423

5. Use the formula $A = 2\pi r^2 + 2\pi rh$ to find the value (nearest whole number) of A if $r = 6$ and $h = 12$

A. $A = 468$ B. $A = 679$ C. $A = 2714$ D. $A = 51616$

6. Sally has recorded the following numbers of tennis serves before serving a fault.

10, 10, 3, 20, 18, 21

What is her median score?

A. 10 B. 13.67 C. 14 D. 18

7. Last year a census was taken. This involved:

A. all people B. a selected few people
C. some volunteers D. people chosen at random

8. Ahmet counts his ducks and pigs. He counts 17 heads and 44 legs. What is the ratio of ducks to pigs?
 A. 5:12 B. 12:5 C. 17:44 D. 44:17
9. Jodie has a plan for making a model aeroplane. The scale is 1:20. If the plan shows the length measuring 100mm then the actual length will be:
 A. 5mm B. 20cm C. 2m D. 5m
10. Sam is buying tiles to cover his bathroom floor. He calculated the number of square tiles with 30cm sides that he would need but he has now decided to buy square tiles with 15cm sides. He calculates that he will need:
 A. $\frac{1}{4}$ of the original number B. $\frac{1}{2}$ the original number
 C. twice the original number D. four times the original number
11. John is 160cm tall and is casting a shadow 180cm long. A nearby bush casts a shadow 160cm long. The height of the bush (to nearest cm) is:
 A. 140cm B. 142cm C. 180cm D. 203cm
12. Dominic is making a board game. He measures the diagonals of the cut board to check that it is square. He finds that it is because:
 A. the diagonals are at right angles and are not equal
 B. the diagonals bisect each other at right angles and are equal
 C. the diagonals bisect each other at right angles and are not equal
 D. the diagonals are equal but do not bisect each other
13. Angus uses a recipe with 2 cups flour, 1 cup water, 3 cups mixed dried fruit, 1 cup brown sugar, $\frac{1}{2}$ cup butter and 2 eggs. He wants to make a larger cake but finds he has only 3 cups of flour. If he uses these how much dried fruit will he need?
 A. 2 cups B. $3\frac{1}{2}$ cups C. 4 cups D. $4\frac{1}{2}$ cups
14. Elise buys a ticket in a raffle. If 100 tickets are sold and there are 3 prizes (1st, 2nd, 3rd) what is her chance of winning first prize?
 A. $\frac{1}{3}$ B. $\frac{1}{97}$ C. $\frac{3}{100}$ D. $\frac{1}{100}$
15. In a number of games two dice are rolled and special results follow if a double is thrown. If Anastasia rolls 2 dice what are her chances of rolling a double?
 A. $\frac{1}{6}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{5}{6}$

16. Niels travels 50 km/h for 30 minutes until he gets to the freeway. He then travels 110km/h for an hour until he reaches his destination. What was his average speed (nearest whole number) for the journey?
 A. 80km/h B. 90km/h C. 107km/h D. 160km/h
17. Given the formula $A = \frac{h}{2}(a+b)$ which of the following is correct?
 A. $a = 2A - b$ B. $b = \frac{2A + ha}{h}$ C. $h = \frac{2(a+b)}{A}$ D. $h = \frac{2A}{a+b}$
18. Which of the following diagrams could satisfy the equation $y = 2x + 3$?
 A. B.
 C. D.
19. The Smith family go camping.
 Grandma and Grandpa
 John and Julie with their 2 children aged 14 and 10
 Sally with her 2 children aged 6 and 4.
 They get 3 powered camping sites.
 The graph below shows the cost of a powered camping site. The basic cost is for two people and children under 5 are free.

 How much do the Smiths pay per night?
 A. \$45 B. \$51 C. \$57 D. \$63
20. Sam has an average of 6 over 5 tests. If he scores 9 in the next test what will his average be?
 A. 6.1 B. 6.5 C. 7.5 D. 7.8

QUESTION 21 (12 Marks).

- (a) (i) Geoff receives a base salary of \$200 per week. He also gets 7.5% of his total sales for the week. If he makes sales of \$500, \$2500, \$90, \$1200 in the week how much will he earn?

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.....
.....

2 marks

- (ii) If he pays no tax on the first \$100 each week then pays 4% on the remainder how much tax will he pay for the week?

.....
.....

2 marks

- (b) Students in 11GM have counted the number of mugs of coffee they drink each day. They find the following results

1, 1, 2, 3, 4, 4, 4, 5, 5, 5

- (i) Draw a cumulative frequency table.

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2 marks

- (ii) Draw a frequency histogram for the table in part (i).

2 marks

- (c) The formula for compound interest is $A = P(1 + r)^n$ where A is the amount or future value, P is the present value, r is the rate percent of interest for the compounding period and is expressed as a decimal value and n is the number of compounding periods.

- i) Find the amount or future value if Ahmet has \$1000 now and it is invested for 5 years compounding annually at a rate of 8%.

.....
.....

2 marks

- ii) Jerry inherits \$10 000 on his 18th birthday. He invests it at 7% for 10 years compounding 6 monthly. How much will he have in 10 years time? (nearest dollar)

.....
.....

2 marks

QUESTION 22 (12 Marks).

(a) The runs scored by Clive's Cricket Team this week were as follows:
17, 19, 0, 55, 95, 8, 13, 17, 34, 18, 66

(i) What was the mean?

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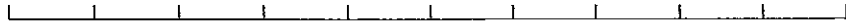
1 mark

(ii) What was the range?

.....
.....

1 mark

(iii) Draw a box and whiskers plot to show the scores.



2 marks

(b) Cath looks at her results for English. She has 80%. The class average is 60 and standard deviation 12.5. She looks at her results for Maths. She has 78%. The class average is 60 and standard deviation 6.5. Which is her better result and why?

.....
.....

2 marks

(c) The following shows a table of a week's tides, high and low, giving time and depth.

SYDNEY TIDE CHART

	a.m.	metres	p.m.	metres
Sunday	1.28	0.48	2.48	0.30
	8.05	1.78	8.41	1.27
Monday	2.08	0.46	3.25	0.29
	8.45	1.75	9.19	1.28
Tuesday	2.46	0.49	4.00	0.32
	9.20	1.75	9.56	1.27
Wednesday	3.25	0.51	4.35	0.32
	9.56	1.71	10.32	1.25
Thursday	4.01	0.53	5.08	0.35
	10.29	1.66	11.11	1.23
Friday	4.42	0.53	5.43	0.41
	11.04	1.54	11.49	1.27
Saturday	5.26	1.58	6.21	0.43
	11.42	1.47		

(i) What is the range of depths on Friday?

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.....

1 mark

(ii) Sonja is on holidays and hopes to swim every day at high tide. What time will she be swimming on Thursday?

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.....

1 mark

(iii) Sven lives further along the coast where tides are half an hour later. What time will be the lowest tide on Monday?

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.....

1 mark

(iv) What will be the lowest high tide for the week and when will it be?

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.....

2 marks

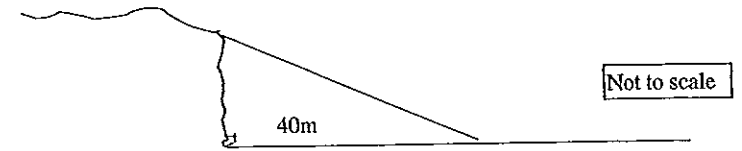
(v) Why would no 4th tide be shown on Saturday?

.....
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1 mark

QUESTION 23 (12 Marks).

(a) Damien is lying on the sand looking at the cliff 40m away. He looks up to the top at an angle of 35°.



(i) Calculate the height of the cliff.

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.....
.....

2 marks

(ii) Make an accurate scale drawing of the triangle. Scale: 1cm = 10m (ie. 1:1000)

3 marks

- (b) Tom has just bought a block of land so he makes a traverse survey of it. He makes the following notebook entries:

	B	
	45	
	27	24 D
C	15	12
	0	
	A	

- (i) Draw a neat sketch of the field (not to scale). 2 marks

- (ii) Calculate the length of AC.

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2 marks

- (iii) Calculate the area of the field.

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3 marks

QUESTION 24 (12 Marks).

- (a) A game is played with 52 cards. There are 4 suits ♣ clubs, ♦ diamonds, ♥ hearts, ♠ spades with equal numbers of each. There are 4 of each number e.g. four threes.

- (i) A card is drawn at random. What is the probability of drawing a ♣ club or a ♠ spade?

.....

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1 mark

- (ii) Two cards are drawn at random. They are both diamonds. What is the probability of the next card drawn being a diamond?

.....

.....

2 marks

- (b) (i) Simon buys 3 tickets in a raffle where 50 tickets were sold. He really hopes to win first prize. What are his chances of winning it?

.....

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1 mark

- (ii) There are 2 prizes. Draw a probability tree to show his chances of losing 1st but winning 2nd prize. Calculate the answer.

.....

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3 marks

(c) Paul and Pauline are playing a game where they throw 2 dice (normal 6 sided). They then move a combination of the two numbers e.g. 10 for a 6 and a 4. If they throw a double they move twice the total shown e.g. 24 for a double six.

(i) Pauline throws the dice. What are her chances of being able to move 20 spaces?

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.....
.....

2 marks

(ii) Paul throws the dice. What are his chances of being able to move 8 spaces?

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.....

3 marks

QUESTION 25 (12 Marks).

(a) (i) Find the value of A given that

$$A = 2\pi r^2 + 2\pi r h \text{ and } r = 4.5 \text{ and } h = 7$$

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.....
.....

1 mark

(ii) Simplify

$$3(x^2 + 1) - 2(x^2 - 2) + 4(2 + x)$$

.....
.....
.....

2 marks

(iii) Simplify

$$\frac{6a^2}{2a} - \frac{14a^4}{7a^2}$$

.....
.....
.....

2 marks

(iv) Solve the following $6z + 5 = 2z + 29$

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1 mark

(b) (i) Write an equation for the following

Guy is 33. He looks at his 2 children, Fay and May. He calculates that their combined ages add to $\frac{2}{3}$ of his age. May is 4 years younger than Fay.

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2 marks

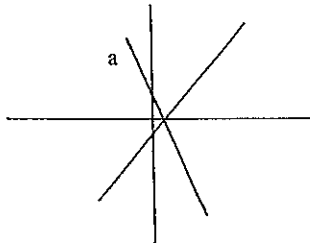
(ii) What are the ages of each person?

.....

1 mark

(c) Given 3 equations

- A $3x - y = 2$
- B $2y = 4x - 1$
- C $y = 2 - 3x$



(i) Which equation could match line a?

.....

1 mark

(ii) For equation $2y - 3x + 1 = 0$ give

gradient.....

1 mark

y-intercept

1 mark

End of Paper

SUGGESTED ANSWERS TO GENERAL MATHS PRELIMINARY

These answers and marks are suggested only. Other alternatives may be acceptable.

SECTION 1 (1 Mark each)

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

SECTION 2

3

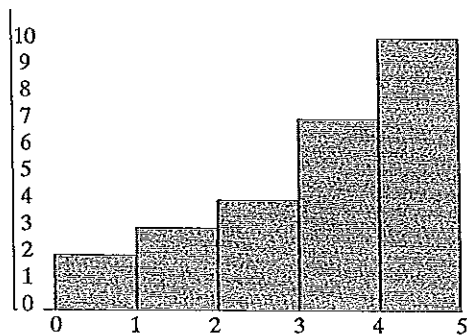
a) i) $\$4290 \times 7.5\% + \$200 = \$521.75$ 1 mark for 7.5% of sales 2 marks

ii) $\$421.75 \times 4\% = \16.87 1 mark for amount taxed 2 marks

b) i) marks 1 mark for knowing what to do 2

Score (x)	Frequency (f)	Cumulative frequency
1	2	2
2	1	3
3	1	4
4	3	7
5	3	10
$\Sigma f = 10$		

ii) marks 1 mark for knowing what to do 2



c) i) $1000 \times 1.08^5 = \$1469.33$ 2 marks

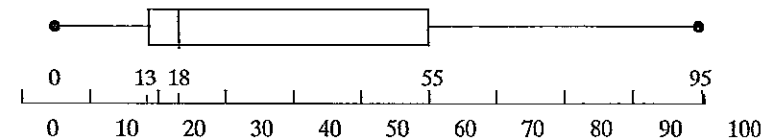
ii) $10\,000 \times 1.035^{20} = \$19\,897.889$ i.e. \$19 898 2 marks

QUESTION 22 (12 Marks)

a) i) 31 1 mark

ii) 95 1 mark

iii) 1 mark for idea of plot with 2 correct figures 2 marks



b) 78% Maths because it is above 2 standard deviations above the mean where English is between 1 and 2 standard deviations above the mean. 1 mark for answer and 1 for reason 2 marks

c) i) $1.54 - 0.41 = 1.13m$ 1 mark

ii) 10.29a.m. (not 11.11 at night) 1 mark

iii) 3.55 p.m. 1 mark

iv) 1.23 at 11.11pm Thursday 1 mark each part 2 marks

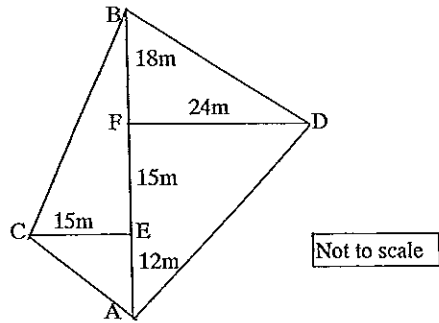
v) It would be after midnight so on Sunday. 1 mark

QUESTION 23 (12 Marks)

a) i) $\tan 35^\circ = \frac{\text{cliff}}{40}$
 $\text{cliff} = 40 \times \tan 35^\circ$
 $= 40 \times 0.7002$
 $= 28.0\text{metres}$ 2 marks

ii) In the scale drawing the lines will be 4cm and 2.8cm with a right angle and a 35° angle. Hypotenuse will be 4.9cm 3 marks

b)



2 marks

(ii) $\sqrt{(12^2 + 15^2)} = 19.2$

2 marks

(iii) $(\frac{1}{2} \times 15 \times 45) + (\frac{1}{2} \times 24 \times 45) = 877.5\text{m}^2$

3 marks

QUESTION 24 (12 Marks)

a) i) $\frac{1}{2}$

1 mark

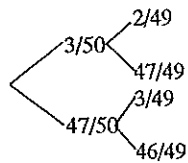
ii) $\frac{11}{50}$

2 marks

b) i) $\frac{3}{50}$

1 mark

ii)



2 marks for tree

$\frac{47}{50} \times \frac{3}{49} = \frac{141}{2450}$

3 marks

c) i) $\frac{1}{36}$

2 marks

ii) $\frac{5}{36}$ 6 2, 2 6, 3 5, 5 3, 2 2 (not 4 4)

3 marks

QUESTION 25 (12 Marks)

a) i) 325.15

1 mark

ii) $x^2 + 4x + 15$

2 marks

iii) $3a - 2a^2$

2 marks

iv) $z = 6$

1 mark

b) i) $M + M + 4 = \frac{2}{3}$ (33)

2 marks

ii) Fay 13, May 9

1 mark if both right

1 mark

c) i) C $y = 2 - 3x$

1 mark

ii) gradient $\frac{3}{2}$
y-intercept $-\frac{1}{2}$

1 mark each