TERTIARY PREPARATION PROGRAM *and* FOUNDATION STUDIES

*m*TEST I*nstructions*

University of Southern Queensland

USQ

TOOWOOMBA

LEARNING AND TEACHING SUPPORT UNIT

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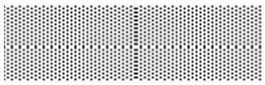


Distance Education Centre
The University of Southern Queensland
Toowoomba Qld 4350
Australia

http://www.usq.edu.au

Produced using *FrameMaker5.5.6* on a Pentium workstation.

This is not an entry test.

The test is meant to give you and us a reasonable idea of your present level of mathematical understanding. You should not be concerned if you find it difficult. The study materials for the **T*ertiary* P*reparation* P*rogram and* F*oundation* S*kills*** are designed to allow you to progress to a mastery of each topic.

General Instructions

1. Complete the information on the next page.

2. Complete the test without assistance. You may use a calculator if you wish. Don't feel pressured to rush through the test but try to complete each part in the time suggested for each part.

3. You may need some scrap paper for rough working. Place your answers neatly in the spaces provided.

4. Try to complete as much of the test as you can. The number of parts that you should complete will but will depend on the course you intend to study at University. See the table below for the part(s) you need to attempt for each course.

Intended Course	***Attempt at least***
Bachelor of Nursing Bachelor of Teaching	Parts A & B
Bachelor Commerce (all majors) Bachelor of Business (all majors) Bachelor of Information Technology (commercial computing and end-user computing majors) Bachelor of Science (Psychology)	Parts A, B & C
Bachelor of Applied Science (all majors except psychology) Bachelor of Technology (all majors) Associate Diploma in Engineering (all majors) Associate Diploma in Surveying Associate Diploma in Mathematics and Computing	Parts A, B, C & D
Bachelor of Engineering (all majors) Bachelor of Information Technology (applied mathematics, industrial and scientific computing and applied computer science majors) Bachelor Surveying	Parts A, B, C & D

Complete this information sheet before attempting the mTest.

1. **Surname** **Given Names**

Phone Number	

2. **Today's Date**: _____/_____/_____
3. **What year did you last study maths?**
4. **What State of Australia were you in at that time?**
   (If you were not resident in Australia, state the country of residence.)
5. **What Grade were you in at that time?** *(Circle one response only.)*

   7 8 9 10 11 12 Other (*give grade*) _____
6. **If you did Junior maths (that is Grade 10) which maths did you take?**
   (*Circle no more than two responses*.)

   Maths A Maths B General Ordinary Advanced Core only
   Core & Extension Don't Remember Other _____
   (*give name of course*)
7. **What mark did you get for each Junior maths course you took?**
   (For example VHA, SA, 75%, passed well, failed, 3 on a 7 point scale, don't remember)

   Course:_____ Mark:_____
   Course:_____ Mark:_____
8. **If you did Senior maths (that is Grade 11 or 12) which maths did you take?**
   (*Circle no more than two responses*.)

   Social Maths Maths in Society Maths I Maths II Maths A Maths B
   Maths C 2 Unit 3 Unit Don't Remember
   Other *(give name of course)*:_____
9. **What mark or grade did you get for each Senior Maths course you took?**
   Course:_____ Mark:_____
   Course:_____ Mark:_____
10. **Have you done any other maths courses outside of school?**
    (For example, TAFE, CES, Adult Education)

    If so give name of course and year
11. **What degree or diploma course are you intending to take at University or TAFE?**
    (For example, Bachelor of Commerce, Associate Diploma of Engineering, Bachelor of Science)
12. **What will be the major area of study in this degree or diploma?**
    (For example, accounting, electrical engineering, biology, psychology, applied mathematics)

OFFICE USE ONLY

Date Marked _____ Assessor_____

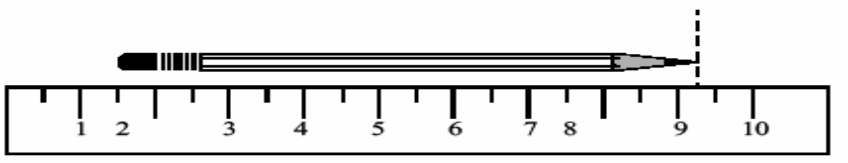
Part A Part B Part C Part D

Recommendation _____

Part A – 10 minutes

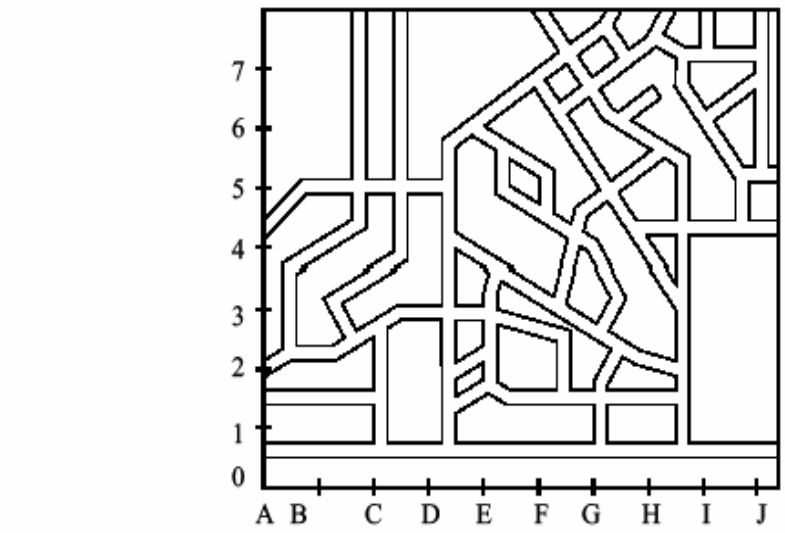
Question	Answer
1. **Write the following number in numerals**: Twenty thousand two hundred and six.	
2. 102 – 36 =	
3. 1 048 + 21 376 =	
4. 23 × 14**5** =	
5. 168 ÷ 12 =	
6. Add the following list of numbers: 213, 4 017, 127.3, 2 198, 21	
7. $\sqrt{64}$ =	
8. \$2 – \$1.34 =	
9. Complete the sequence by filling in the missing numbers: 2 9 16 23 __ __	

10. The diagram below represents a ruler being used to measure the length of a pencil.



The length of the pencil is _____ cm.

11. The following is a section of a road map**:**



Mark on the map (with an X) the positions F2 and D3.5

12. The following is an extract from a bank account book**:**

Date	**Deposit**	**Withdrawal**	**Balance**
13/01/92			51 717.11
26/01/92		400.00	51 317.11
31/01/92	636.21		51 953.32
09/02/92		400.00	51 553.32
10/02/92		20.83	51 532.49
23/02/92		500.00	51 032.49
28/02/92	589.57		
10/03/92		20.83	
31/03/92		900.00	

12. Continued

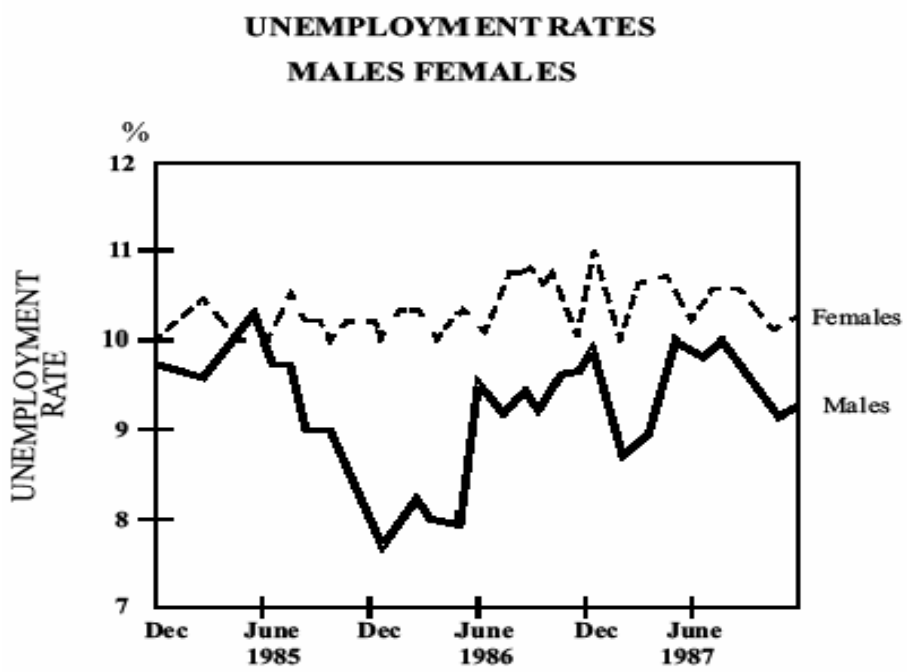
Some definitions…

Deposit	Add money to the bank account
Withdrawal	Take money out of the account
Balance	The amount of money in the account

What was the balance of the account on 31/03/92? $_____

(Hint: Complete the missing balances.)

13. The following is a graph showing the national unemployment rates for males and females.



(a) According to this graph, does the unemployment rate tend to be higher for males or females? _____

(b) When was the lowest male unemployment rate? _____

(c) When was the only time that the male unemployment rate was greater than the female unemployment rate? _____

End of Part A

Part B – 40 minutes

	Question	Answer
1.	(a) $\frac{3}{4} = \frac{15}{?}$	
	(b) $7 + 2 \times 3 =$	
	(c) Round 495 to the nearest 10	
	(d) $12 + ? = -6$	
	(e) 15% of \$321.00	
	(f) Express $\frac{3}{4}$ as a decimal	
	(g) $-5 \times -3 =$	
	(h) $\frac{3}{4} - \frac{2}{9} = ?$	
	(i) $-16 - -4 =$	
	(j) Express 24% as a decimal	
	(k) $\left\{20 - 2\left[3 + \left(\frac{12}{4}\right)\right]\right\}^2$	
	(l) Give two values of t which satisfy the inequality $t \leq -4$	
	(m) Express 3^{-2} as a fraction	
2.	(a) 360 mm = m	
	(b) 1.23 mg = g	
	(c) $1.13 \times 10^1 + 9.1 \times 10^{-1} =$	
	(d) $4.1 \times 10^4 - 1 \times 10^3 =$	

3. A company registered on the stock exchange had the following share prices of stock listed in the newspaper.

Day	**Cost**
May 3	1.40
May 10	1.60
May 17	1.80
May 24	Figures not available
May 31	1.40
June 7	1.40
June 14	1.60

(a) Draw a graph showing how the cost of the shares changes with time.

(b) What would you expect the share price to be on May 24?

(c) What would you expect the share price to be on June 21?
Explain your answer.

4. A patient is to receive 420mL of fluid over a 7 hour period from a drip machine:

(a) What is this rate in millilitres per minute (mL/min) ?

(b) If the drip machine delivers medicine at the rate of 60 drops per millilitre, how many drops per minute will be needed to deliver the medicine in the correct time?

5. A 598 m^2 suburban block of land was advertised for sale at $39000, while an equally well situated block of area 980 m^2 was priced at $64000. Which was the better value for money on a dollars/square metre basis? Justify your answer.

6. On a plan of a house, a rectangular room is shown with sides of length 6cm and 8cm respectively. If the scale used is 1:80 what are the lengths of the room?

7. A gardener marks out a new section of lawn that is supposed to be a rectangle with sides of length 15m and 10m respectively. To check he has marked out a rectangle he measures the length of the diagonal. How long should this be?

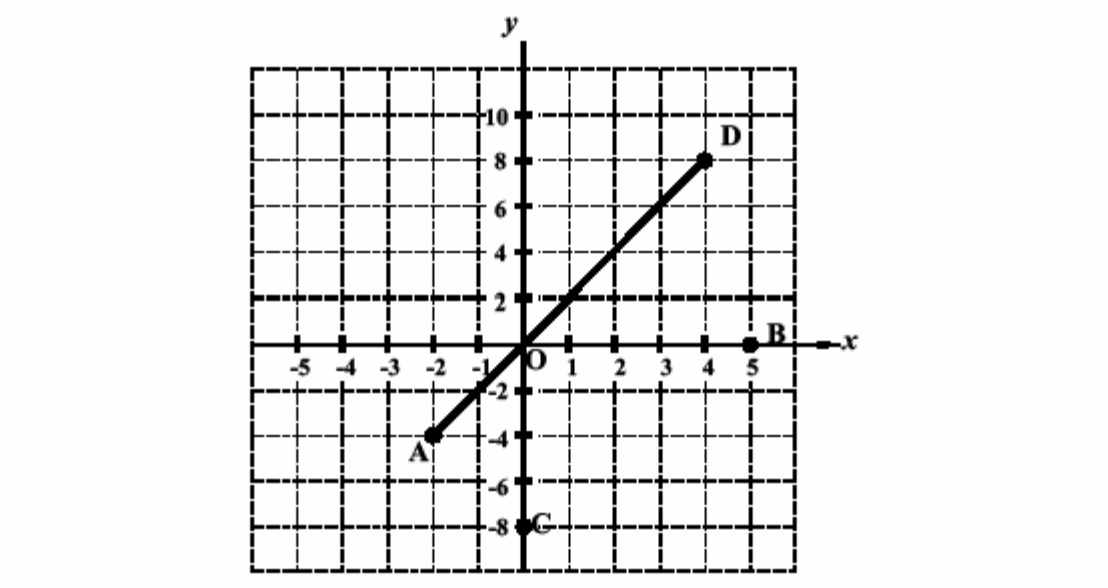
End of Part B

Part C – 40 minutes

1.

Question	Answer
(a) Evaluate $\sqrt{x^2 + y^2}$ when $x = 3$ and $y = 4$	
(b) Expand $(x + 1)(x – 2)$	
(c) Simplify $6x^2 + y^2 – x^2 + 5 + x – 3y^2$	
(d) Solve $3(2x + 1) = 21$	
(e) Solve $5x + 7 = 2x – 3$	
(f) Make x subject of the formula $2y = \frac{5 - \sqrt{x}}{3}$	
(g) Factorize $3ax + 12a$	
(h) Evaluate $y = 3^x$ when $x = 4$	
(i) Find the values of x and y if $x + 2y = 4$ and $2x – 3y = 5$	

2. (a)



For the above graph find:

(i) its slope	
(ii) the y - intercept	
(iii) its equation	
(iv) The distance between points A and D?	

(b) Draw the graph of $y = 3x^2 + 4x$ for $-2 \leq x \leq 2$

3. (a) **Complete**

$\sin^2\theta + \ldots\ldots\ldots\ldots = 1$

$\dfrac{\sin\theta}{\cos\theta} = \ldots\ldots\ldots\ldots$

(b) A company wishes to build an up-market shopping centre which uses flat moving walkways rather than escalators between the floors of its building. The floors are to be built 10m apart and it has been decided that the walkways will be inclined at 20^o. How long will each walkway have to be to fit these specifications?

(As part of your answer draw a diagram to represent this information.)

(c) On the same axes sketch the graph of $y = \sin x$ and $y = \cos x$ for $0^o \leq x \leq 360^o$.

End of Part C

Part D– 40 minutes

1.

(a) Write $\frac{1}{x^2 - y^2} + \frac{y}{x + y}$ as a single fraction	
(b) Give the domain and range of $f(x) = \sqrt{x - 2}$	
(c) Complete these rules: (i) $\log ab$ =	
(ii) $\log a^b$ =	
(d) Factorize $x^3 - 7x - 6$	

2.

(a) Find all the angles between 0º and 360º which satisfy $\sin\theta = 0.58$	
(b) Convert 329º to radians.	

3.

(a) Sketch the function $f(n) = 2^{n-1}$ for n = 1, 2, 3, …

(b) Sketch the graph of $y = 1\text{n}\,x$

4.

Differentiate with respect to:	
(a) $y = 2\sqrt{x} - \frac{4}{x} + 10$	
(b) $\sin x^2$	
(c) $e^x \cos x$	

5.

Find the following integrals:	
(a) $\int 3x^5 + e^x \, dx$	
(b) $\int \frac{1}{x} \, dx$	
(c) $\int \frac{1}{2} \cos 2x \, dx$	
(d) $\int_4^6 2x^2 \, dx$	

End of Part D