



Sino Bright School Chongqing

Monthly Exam, 2024-2025 T2

Subject: Further Math

Date: May 2025

Time: 60 Minutes

Teacher Responsible: Shi Feng

IMPORTANT: Read together before beginning the exam.

Students must complete the assessments to the best of their ability. Any students found cheating during an exam will be given a zero and referred to the Principal for further disciplinary measures. Cheating is a serious offense.

"Cheating" may include any of the following:

- Having course papers, notes, unapproved data sheets or other course-related materials in the exam room without the express permission of the subject class teacher in charge of the exam.
- Using or even having a cellphone or other electronic device in the exam room without the express permission of the subject class teacher in charge of the exam.
- Attempting to communicate, either verbally or non-verbally with other students during the exam.
- Having exam-related materials prior to the writing of the exam.

Mark Breakdown:	Student Name: _____
Part 1: Multiple Choice Questions $5pts \times 10$	
Part 2: Short Answer Questions $5pts \times 4$	
Part 3: Long Answer Questions $15pts \times 2$	
Total Score: 100	Score: _____

Special Instructions/Materials Allowed:

- Pen
- Calculator



Part I: Multiple Choice Questions ($5pts \times 10$)

- If a root of $f(x) = 0$ lies in $[3, 4]$, what is the midpoint after the first iteration?
 - 3.25
 - 3.5
 - 3.75
 - 3.0
- The formula for the next approximation x_1 using linear interpolation is:
 - $x_1 = a - \frac{f(a)(b-a)}{f(b)-f(a)}$
 - $x_1 = \frac{a+b}{2}$
 - $x_1 = a - \frac{f(a)}{f'(a)}$
 - $x_1 = \frac{f(b)-f(a)}{b-a}$
- The directrix of the parabola $y^2 = 24x$ is:
 - $x = -6$
 - $x = 6$
 - $y = -6$
 - $y = 6$
- The modulus of $z = 3 + 4i$ is:
 - 5
 - 7
 - 12
 - 25
- The iteration formula is $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$. What condition is critical for convergence?
 - $f'(x_n) \neq 0$
 - $f(x_n) > 0$
 - $f(x_n) < 0$
 - $f'(x_n) = 0$
- If $z = 2 - 5i$, then $z + z^*$ equals:
 - 4
 - $-10i$
 - $4 - 10i$
 - 0
- A root exists in $[a, b]$ if:
 - $f(a)$ and $f(b)$ are positive
 - $f(a) \times f(b) < 0$
 - $f(a) = f(b)$
 - $f(a) \times f(b) > 0$
- The Cartesian equation for $x = 2t$, $y = 4t^2$ is:
 - $y = x^2$



- B) $y = 2x^2$
- C) $y = \frac{x^2}{4}$
- D) $y = 4x^2$

9. The asymptotes of $xy = 9$ are:

- A) $x = 0$ and $y = 0$
- B) $x = 3$ and $y = 3$
- C) $x = 9$ and $y = 9$
- D) None

10. If a quadratic equation has roots α and β , then $\alpha + \beta =$

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

Part II: Fill-in-the-Blank ($5pts \times 4$)

1. After 3 iterations of interval bisection on $[3, 4]$, the interval length is _____.
2. For $f(2) = -3$ and $f(4) = 5$, the next approximation using linear interpolation is _____.
3. The focus of the parabola $y^2 = 28x$ is at _____.
4. The argument of $z = -1 - i$ (in radians) is _____.

Part III: Long Answer Questions ($15pts \times 2$)

1. Use the Newton-Raphson method with $x_0 = 2$ to approximate a root of $f(x) = x^3 - 2x - 5$. Perform 2 iterations.



2. Let $z = 1 + \sqrt{3}i$.

(a) Find $|z|$ and $\arg(z)$.

(b) Express z in modulus-argument form.

(c) Solve $z^2 = 1 + \sqrt{3}i$.