

Name: _____

Score: _____ / 100

Student ID: _____

DO NOT OPEN THE EXAM UNTIL YOU ARE TOLD TO DO SO

	1	2	3	4	5	6	7	8	9	10	Total
✓											27
Score											
Pts. Possible	3	3	3	3	3	3	3	3	3	3	29

INSTRUCTIONS FOR STUDENTS

- Questions are on both sides of the paper. This is an 10 question exam.
- Students have 2 hours and 15 minutes to complete the exam.
- The test will be out of **27 points**. The highest possible score will be **29 points**. You must complete 9 problems for credit (3 points each, 27 points total). If you wish, you can attempt a 10th problem for extra credit. That question will be out of 2 points, for a maximum of 29 possible points.
- In the above table, the row with the ✓ should be marked for the 9 questions you want graded. Mark **EC** for the extra credit problem.
- You may complete parts of problems, as partial credit will be given based on correctness, completeness, and ideas that are leading to the correct solutions.
- **PLEASE SHOW ALL WORK**. Any unjustified claims will receive no credit. Clearly box your final answer.
- No notes, textbooks, phones, calculators, etc. are allowed for the exam.
- The back of the test can be used for scratch work.

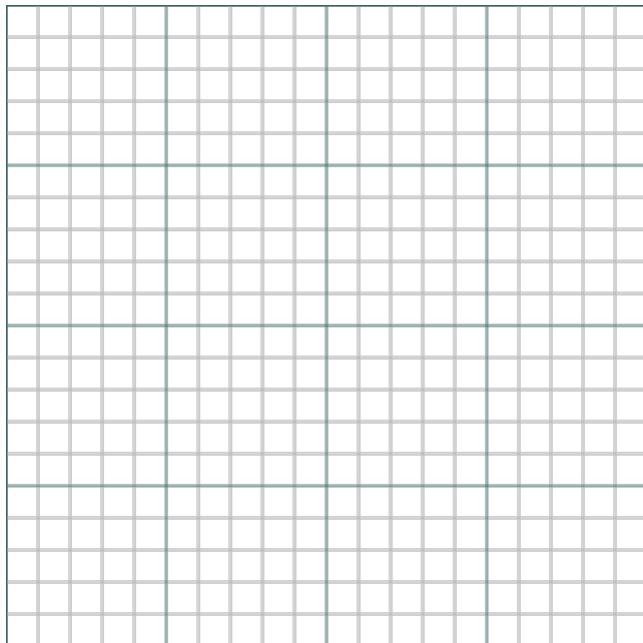
GOOD LUCK!

FORMULAS:

Name	Formula
Foci for ellipse	$c^2 = a^2 - b^2, a > b$
Foci for hyperbola	$c^2 = a^2 + b^2$
n^{th} term of Arithmetic Series	$a_n = a_1 + (n - 1)d$
Sum of Arithmetic Series	$S_n = \frac{n}{2}(a_1 + a_n)$
Finite Geometric Series	$\sum_{j=1}^n ar^{j-1} = \frac{a(1 - r^n)}{1 - r}$
Infinite Geometric Series	$\sum_{j=1}^{\infty} ar^{j-1} = \frac{a}{1 - r}$
Binomial coefficients	$\binom{n}{r} = \frac{n!}{r!(n-r)!}$
Binomial Theorem	$(a + b)^n = \sum_{r=0}^n \binom{n}{r} a^{n-r} b^r$

1) Graph the following function. Clearly label all asymptotes and the x and y -intercepts.

$$f(x) = -\left(\frac{1}{4}\right)^{x-1} + 1$$



2) (a) Combine the logarithms into one logarithm:

$$3 \log_2(x) - 4 \log_2(x + 3) + \log_2(y) - \log_2(2)$$

(b) Solve following exponential equation for x :

$$4^{x+2} = \left(\frac{1}{32}\right)^{1-x}$$

3) Solve the following system of equations.

$$\begin{cases} x & - 6y & + 4z & = & -12 \\ x & + y & - 4z & = & 12 \\ 2x & + 2y & + 5z & = & -15 \end{cases}$$

- 4) Write an equation for the ellipse having foci at $(0,2)$ and $(0,-2)$, and vertices at $(0, 3)$, and $(0, -3)$.

5) Write the following equation for the hyperbola in standard form. Then identify the center and the values of a and b .

$$9x^2 - 4y^2 - 36x + 48y - 144 = 0$$

6) (a) Find the general term in the sequence:

$$\{a_n\} = -\frac{3}{2}, \frac{7}{4}, -\frac{11}{8}, \frac{15}{16}, -\frac{19}{32}, \dots$$

(b) Find the following sum using the general term found in part (a):

$$\sum_{n=1}^4 \{a_n\}$$

7) Consider the sequence $\{a_n\} = \{3, -1, \frac{1}{3}, -\frac{1}{9}, \frac{1}{27}, \dots\}$.

- a) Identify the type of sequence $\{a_n\}$.
- b) What is the value of the term a_{11} ? (Leave the answer as a fraction)
- c) Find the sum of the following series: $\sum_{n=1}^{\infty} a_n$

8) Use induction to prove:

$$S_n = \sum_{j=1}^n j = \frac{n(n+1)}{2}$$

- 9) Use the binomial theorem to determine the 7th term in the expansion of $(2x + y^4)^{10}$

10) Suppose you flip a biased coin so that the probability of getting heads is $a = \frac{3}{4}$, or 75 %. What is the probability of getting heads 2 times and tails once? (You can leave your answer as a fraction).

THIS PAGE IS LEFT BLANK FOR ANY SCRATCH WORK

END OF TEST