

# Exam Paper: MATH

Questions:

1. What is the Pythagorean theorem and explain its application?
2. Derive the quadratic formula from the general form of a quadratic equation.
3. Explain the concept of limits in calculus.
4. Solve the following system of equations using substitution method:  $2x + y = 10$  and  $3x - y = 5$ .
5. What are eigenvalues and eigenvectors? Provide an example.
6. Describe the difference between permutations and combinations.
7. What is the fundamental theorem of algebra?
8. Explain how the binomial theorem can be used to expand expressions.
9. Find the derivative of the function  $f(x) = x^3 + 5x^2 - 2x + 7$ .
10. Explain the concept of mathematical induction and prove the sum formula for the first  $n$  integers.