5 Lecture - MTH101

Important Subjective

1. **What is the Pythagorean theorem, and how is it used to calculate distance?**
   Answer: The Pythagorean theorem states that the square of the hypotenuse of a right-angled triangle is equal to the sum of the squares of the other two sides. It is used to calculate the distance between two points in a Cartesian plane.

2. **How is the equation of a circle derived?**
   Answer: The equation of a circle is derived using the distance formula, where the distance between any point on the circle and the center is equal to the radius.

3. **What is the quadratic formula, and how is it used to solve quadratic equations?**
   Answer: The quadratic formula is used to solve quadratic equations of form ax^2 + bx + c = 0. It is given as x = (-b +/- sqrt(b^2 - 4ac)) / 2a.

4. **What are the three cases for the solutions of a quadratic equation, based on the discriminant?**
   Answer: If the discriminant (b^2 - 4ac) is positive, the quadratic equation has two real solutions. If the discriminant is zero, the quadratic equation has one real solution. If the discriminant is negative, the quadratic equation has two complex solutions.

5. **How can the equation of a circle be used to determine the radius of a circular object?**
   Answer: If the equation of the circle is given in the form (x - h)^2 + (y - k)^2 = r^2, then the radius of the circle is equal to r.

6. **What is the distance between points (2, 3) and (5, 7)?**
   Answer: Using the distance formula, the distance between the two points is d = sqrt((5-2)^2 + (7-3)^2) = sqrt(9 + 16) = sqrt(25) = 5 units.

7. **What is the center and radius of the circle with equation (x - 2)^2 + (y + 3)^2 = 25?**
   Answer: The center of the circle is (2, -3), and the radius is 5 units.

8. **What is the discriminant of the quadratic equation 3x^2 - 4x + 1 = 0?**
   Answer: The discriminant is b^2 - 4ac = (-4)^2 - 4(3)(1) = 4, which is positive. Therefore, the equation has two real solutions.

9. **How can the equation of a circle be used to model the trajectory of a projectile?**
   Answer: The equation of a circle can be used to model the trajectory of a projectile if the projectile follows a parabolic path. In this case, the equation of the circle can be modified to include additional variables, such as time and acceleration.

10. **How can quadratic equations be used to solve problems related to motion, such as calculating the speed and acceleration of an object?**
    Answer: Quadratic equations can be used to model the motion of an object using equations of motion. These equations can be solved to determine the speed, acceleration, and other parameters of the object's motion.