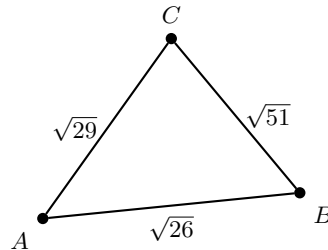


Question 4

The points $A = (1, 0, 2)$, $B = (4, 4, 1)$, and $C = (-1, 3, 6)$ form a triangle. Classify it as scalene, isosceles, or equilateral, and determine whether it is acute, right, or obtuse.

Question 4 – Solution

Strategy Compare squared side lengths; this avoids unnecessary square roots. The converse of the Pythagorean theorem classifies the largest angle.



Side lengths Direct calculation gives

$$AB^2 = 3^2 + 4^2 + (-1)^2 = 26, \quad AC^2 = (-2)^2 + 3^2 + 4^2 = 29, \quad BC^2 = (-5)^2 + (-1)^2 + 5^2 = 51.$$

The three lengths differ, so the triangle is scalene.

Angle classification The longest side is BC . Since $BC^2 = 51 < 26 + 29 = 55$, the angle opposite BC is acute. The other angles are necessarily smaller, so the triangle is scalene and acute.

Verification The triangle inequality holds; for example, $\sqrt{26} + \sqrt{29} > \sqrt{51}$.