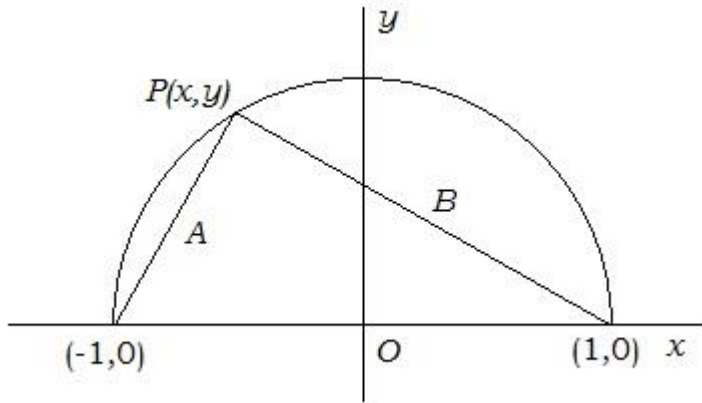


Answer on Question #44597 – Math – Geometry

(1) Using Coordinate geometry prove that angle in a semi circle is a right angle

Solution:

Consider the following diagram:



Without loss of generality, we have chosen a unit semicircle whose center is at the origin.

Point P is $(x, y) = (x, \sqrt{1 - x^2})$

The slope of line segment A is:

$$m_A = \frac{\sqrt{1 - x^2} - 0}{x - (-1)} = \frac{\sqrt{1 - x^2}}{1 + x} = \sqrt{\frac{1 - x}{1 + x}}$$

The slope of line segment B is:

$$m_B = \frac{\sqrt{1 - x^2} - 0}{x - 1} = -\frac{\sqrt{1 - x^2}}{1 + x} = -\sqrt{\frac{1 + x}{1 - x}}$$

Two lines are perpendicular if the product of their slopes is -1 .

$$m_A \cdot m_B = -\sqrt{\frac{1 - x}{1 + x}} \cdot \sqrt{\frac{1 + x}{1 - x}}$$

Thus, we know line segments A and B are perpendicular, and so the triangle is a right triangle.