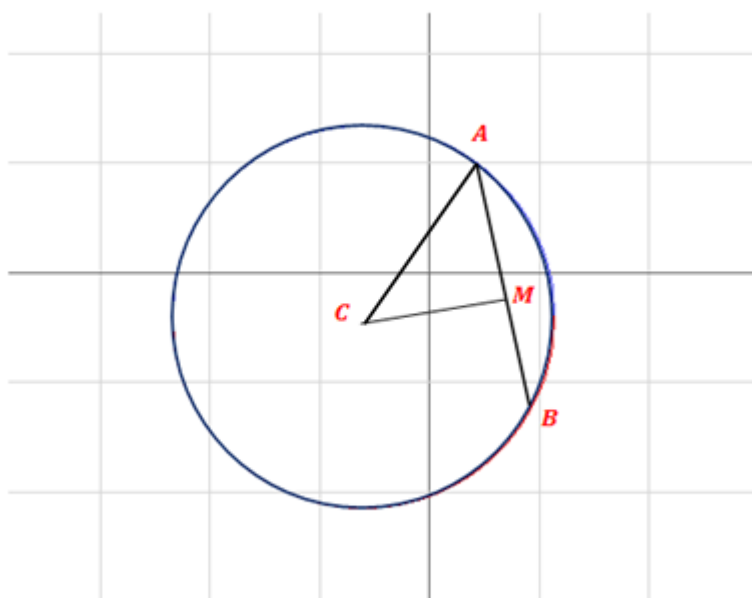


## Answer on Question #56369 – Math – Analytic Geometry

### Question

A circle has its center at  $C(-3,-2)$  and radius square root of 76. Find the length of its chord bisected at  $M(4,-1)$ .

### Solution



A radius drawn to the midpoint of a chord is perpendicular to the chord (Two points that are equidistant from the endpoints of a segment lie on the perpendicular bisector of the segment).

We find  $CM$  using the distance formula:

$$CM = \sqrt{(4 + 3)^2 + (-1 + 2)^2} = \sqrt{50} = 5\sqrt{2}.$$

$\triangle CMA$  is a right triangle.  $CA$  is a radius so  $CA = \sqrt{76}$ .

Using the Pythagorean Theorem, we find  $AM$ :

$$AM^2 + CM^2 = CA^2;$$

$$AM^2 = CA^2 - CM^2;$$

$$AM^2 = 76 - 50 = 26;$$

$$AM = \sqrt{26}.$$

Since  $M$  is a midpoint of  $AB$ , we have  $AB = 2\sqrt{26}$ .

**Answer:** the length of the chord bisected at  $(4,-1)$  of the given circle is  $2\sqrt{26}$ .