Before we begin, are there any questions from last day's work?

7

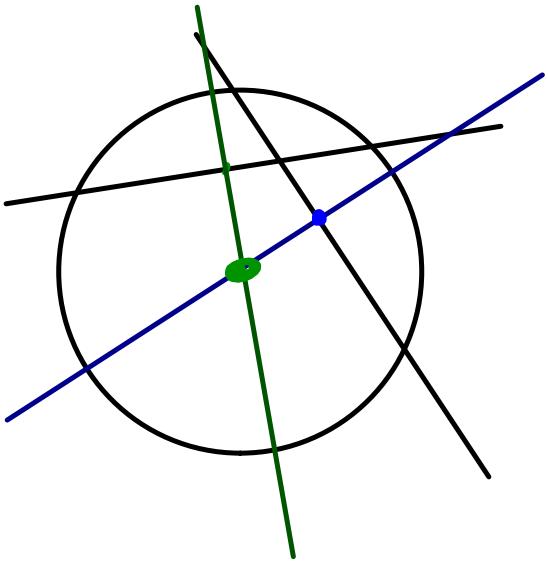
Today's Learning Goal(s):

By the end of the class, I will be able to:

a) verify that the right bisector of a chord goes through the centre of a circle.

b) verify that points lie on a circle, if the centre is given.

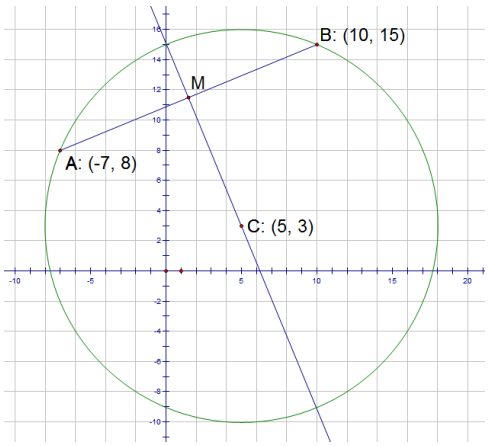
p.150 #7



MPM 2DI 3.5 Properties of Circles (Day 2) Date: Oct. 18/16

Ex.1 Using analytic geometry,
verify that the centre of this circle lies on the right bisector of chord AB.

Note: You **MAY NOT** use the point C to create the equation for the right bisector.



$M_{AB}\left(\frac{-7+10}{2}, \frac{8+15}{2}\right)$

$M\left(\frac{3}{2}, \frac{23}{2}\right)$

$m_{AB} = \frac{15-8}{10-(-7)} = \frac{7}{17}$

$m_{\perp} = -\frac{1}{m_{AB}} = \frac{-17}{7}$

$y = -\frac{17}{7}x + b$

$\frac{23}{2} = -\frac{17}{7}\left(\frac{3}{2}\right) + b$

$\frac{23}{2} = \frac{-51}{14} + b$

$\frac{23}{2} + \frac{51}{14} = b$

$\frac{161}{14} + \frac{51}{14} = b$

$\frac{212}{14} = b$

$\frac{106}{7} = b$

$\therefore y = \frac{-17}{7}x + \frac{106}{7}$ is the eqn of the right bisector.

$\left(\frac{3}{2}, \frac{23}{2}\right)$ $y = \frac{-17}{7}x + \frac{106}{7}$

verify C(5,3) is on right bisector

LS = y = 3

RS $= \frac{-17}{7}x + \frac{106}{7}$

$= \frac{-17}{7}\left(\frac{5}{1}\right) + \frac{106}{7}$

$= \frac{-85}{7} + \frac{106}{7}$

$= \frac{21}{7}$

$= 3$

$\therefore LS = RS$

$\therefore$ C is on the right bisector of chord AB.

Ex.2 Points on a Circle

a) Using analytic geometry, verify that the points D(7, 3), E(9, -5), and F(1, -7) lie on the circumference of the circle with its centre at C(4, -2).

Each point must be the same distance from the centre.
∴ compare the lengths of CD, CE, and CF.

$|CD| = \sqrt{(7-4)^2+(3-(-2))^2} = \sqrt{3^2+5^2} = \sqrt{9+25} = \sqrt{34}$ units

$|CE| = \sqrt{(9-4)^2+(-5-(-2))^2} = \sqrt{5^2+(-3)^2} = \sqrt{25+9} = \sqrt{34}$ units

$|CF| = \sqrt{(1-4)^2+(-7-(-2))^2} = \sqrt{(-3)^2+(-5)^2} = \sqrt{9+25} = \sqrt{34}$ units

$\therefore |CD| = |CE| = |CF|$

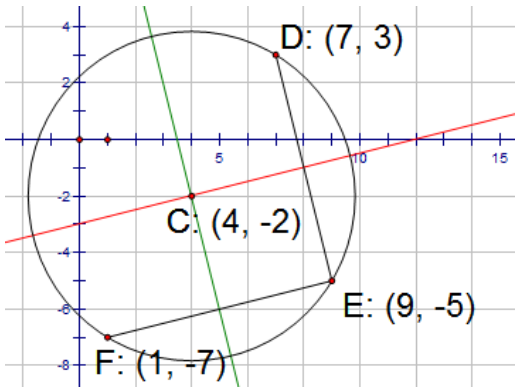
∴ C is the centre with D, E, & F on the circle.

b) Does any other circle pass through points D, E and F? Explain.

The right bisector of DE includes all points that are equidistant from D and E.

Similarly, the right bisector of EF includes all points that are equidistant from E and F.

These two lines meet only at point C(4,-2).
There is no other point equidistant from D, E, and F.



Today's entertainment:

READ p.149 "Key Concepts"

p. 150 #4, 5, 9 (Hint for #9: graph first, then determine **the equations of the right bisector lines** of AB and AC.)
(You are NOT allowed to estimate where you believe the centre is).

Optional Extra question on the next slide; solution on website.

MPM 2DI 3.5 Properties of Circles (Extra) Date: _____

Ex. Given the points G (2 , 12), H(6 , 4) and I(9 , 13):

a) Find C, the centre of the circle through G, H, and I.

b) Determine the length of the radius of the circle.

c) **IF** this circle were centred at the origin, write its equation.

Hint:

Avoid GI.