Name: _____

CC Geometry Homework

Midpoint Formula

1) To prove that the diagonals of a quadralateral bisect each other, show that the

   A) diagonals have the same midpoint
   B) slopes of the diagonals are equal
   C) diagonals have the same length
   D) slopes of the diagonals are negative reciprocals

2) What is the midpoint of the line segment that connects (2,-6) and (18,12)?

3) If M(-2,5) is the midpoint of $\overline{AB}$ and the coordinates of A are (4,7), find the coordinates of B. [*Show all work.*]

4) Write an equation of the line that is the perpendicular bisector of the line segment having endpoints of (-3,7) and (5,-3). [*Show all work.*]

5) If the endpoints of the diameter of a circle are (3,1) and (6,5), then find the:
   (1) length of the diameter.
   (2) coordinates of the center of the circle.

1) A

2) (10,3)

3) (-8,3)

WORK SHOWN: Mdpt $(-2,5) = [\frac{1}{2}(x_1 + x_2), \frac{1}{2}(y_1 + y_2)]$; $-2 = \frac{1}{2}(4 + x_2)$, $-4 = 4 + x_2$, $-8 = x_2$; $5 = \frac{1}{2}(7 + y_2)$, $10 = 7 + y_2$, $3 = y_2$

4) SAMPLE ANSWER: $y - 2 = \frac{4}{5}(x - 1)$

WORK SHOWN: $m = \frac{y_1 - y_2}{x_1 - x_2} = \frac{7 + 3}{-3 - 5} = -\frac{10}{8} = -\frac{5}{4}$; Midpt $= (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}) = (\frac{-3 + 5}{2}, \frac{7 - 3}{2}) = (1,2)$; $-\frac{1}{m} = \frac{4}{5}$, $m_\perp = \frac{4}{5}$;

$y - y_1 = m(x - x_1)$, $y - 2 = \frac{4}{5}(x - 1)$

5) (1) 5

WORK SHOWN: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(6 - 3)^2 + (5 - 1)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$;

(2) (4.5,3)

WORK SHOWN: midpoint $= (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}) = (\frac{3 + 6}{2}, \frac{5 + 1}{2}) = (4.5,3)$