$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \qquad d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad x^2 + y^2 = r^2$$

Proficiency Demonstrated: **Perfect ❏   Sufficient ❏   Insufficient (Repeat Evaluation) ❏**

MPM2D - Essential Skills Proficiency Assessment # 2 - Coordinate Geometry

1. Determine the distance between the points P(6, 4) and Q(4, 9). Give an **exact answer** and an **approximate answer** rounded to two decimal places.

2. Determine the coordinates of the **midpoint** of the line segment with the following endpoints.

   A(10, –8) and B(–12, –16)

3. Determine the **equation** and the **radius** of a circle centred at (0, 0) and passing through (–16, 30).

4. Determine the equation of the line that is **perpendicular to** $y = \frac{1}{2}x + 2$ and passes through the point P(–14, –2).

MPM2D - Essential Skills Proficiency Assessment # 2 - Coordinate Geometry
Answer Section

1. $d = \sqrt{\left(x_Q - x_P\right)^2 + \left(y_Q - y_P\right)^2}$

   $d = \sqrt{\left((4) - (6)\right)^2 + \left((9) - (4)\right)^2}$

   $d = \sqrt{(-2)^2 + (5)^2}$

   $d = \sqrt{29}$ exact answer

   $d \approx 5.39$ approximate answer

2. $M\left(\dfrac{x_A + x_B}{2}, \dfrac{y_A + y_B}{2}\right) = M\left(\dfrac{(10) + (-12)}{2}, \dfrac{(-8) + (-16)}{2}\right)$

   $= M\left(\dfrac{-2}{2}, \dfrac{-24}{2}\right)$

   $= M\left(-1, -12\right)$

3. $r^2 = (-16)^2 + (30)^2$ Equation: $x^2 + y^2 = 1156$ radius = 34

   $r^2 = 1156$

   $r = \pm\sqrt{1156}$ but $r > 0$

   $\therefore r = 34$

4. perpendicular slope: $m = -2$

   equation is: $y = -2x + b$
   sub P(–14, –2): $-2 = -2(-14) + b$

   $-30 = b$

   $b = -30$

   perpendicular equation: $y = -2x - 30$