NAME __Key__ DATE _____ PERIOD _____

Geometry Lab Recording Sheet

(Use with Extend 3-4 on page 204 in the Student Edition)

Equations of Perpendicular Bisectors

$\perp m$ = perpendicular slope
m = slope
$\therefore$ = therefore
mdpt = midpoint
eqn = equation

Materials
grid paper

Exercises

Find the equation of the perpendicular bisector $\overline{PQ}$ for the given endpoints.

1. $P(5, 2)$, $Q(7, 4)$

$m = \frac{4-2}{7-5} = \frac{2}{2} = 1$

$\therefore \perp m = -1$

mdpt $= \left(\frac{5+7}{2}, \frac{2+4}{2}\right) = (6, 4)$

eqn: $y - 4 = -1(x - 6)$

$y = -x + 10$

2. $P(-3, 9)$, $Q(-1, 5)$

$m = \frac{9-5}{-3-(-1)} = \frac{4}{-2} = -2$

$\perp m = \frac{1}{2}$

mdpt $= \left(\frac{-3-1}{2}, \frac{9+5}{2}\right) = (-2, 7)$

eqn: $y - 7 = \frac{1}{2}(x + 2)$

$y = \frac{1}{2}x + 8$

3. $P(-6, -1)$, $Q(8, 7)$

$m = \frac{7+1}{8-(-6)} = \frac{8}{14} = \frac{4}{7}$

$\perp m = -\frac{7}{4}$

mdpt: $\left(\frac{-6+8}{2}, \frac{-1+7}{2}\right) = (1, 3)$

eqn: $y - 3 = -\frac{7}{4}(x - 1)$

$y = -\frac{7}{4}x + 4\frac{3}{4}$

4. $P(-2, 1)$, $Q(0, -3)$

$m = \frac{-3-(1)}{0-(-2)} = \frac{-4}{2} = -2$

$\perp m = \frac{1}{2}$

mdpt: $\left(\frac{-2+0}{2}, \frac{1-3}{2}\right) = (-1, -1)$

eqn: $y + 1 = \frac{1}{2}(x + 1)$

$y = \frac{1}{2}x$

5. $P(0, 1.6)$, $Q(0.5, 2.1)$

$m = \frac{2.1-1.6}{0.5-0} = \frac{0.5}{0.5} = 1$

$\perp m = -1$

mdpt: $\left(\frac{0+0.5}{2}, \frac{1.6+2.1}{2}\right)$
$= (0.25, 1.85)$

eqn: $y - 1.85 = -1(x - 0.25)$

$y = -x + 2.1$

6. $P(-7, 3)$, $Q(5, 3)$

$m = \frac{3-3}{5-(-7)} = \frac{0}{12} = 0$

$\perp m = $ undefined

mdpt: $\left(\frac{-7+5}{2}, \frac{3+3}{2}\right) = (-1, 3)$

eqn: $x = -1$

7. Extend what you have learned to find the equations of the lines that contain the sides of $\triangle XYZ$ with vertices $X(-2, 0)$, $Y(1, 3)$, and $Z(3, -1)$.

$X(-2, 0)$, $Y(1, 3)$

$\overline{XY}$: $m = \frac{3-0}{1-(-2)} = \frac{3}{3} = 1$

eqn: $y - 0 = 1(x - (-2))$

$y = x + 2$

$X(-2, 0)$, $Z(3, -1)$

$\overline{XZ}$: $m = \frac{-1-0}{3-(-2)} = \frac{-1}{5}$

eqn: $y - 0 = -\frac{1}{5}(x - (-2))$

$y = -\frac{1}{5} + 2$

$Y(1, 3)$, $Z(3, -1)$

$\overline{YZ}$: $m = \frac{-1-3}{3-1} = \frac{-4}{2} = -2$

eqn: $y - 3 = -2(x - 1)$

$y = -2x + 5$

Stephen continues to be fascinated by questions of scale.