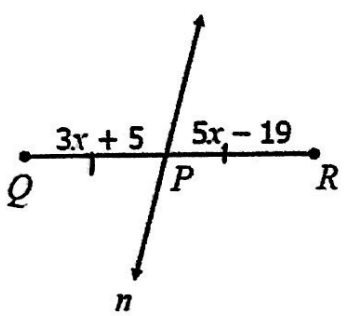
Key Ideas	Notes
Finding a Missing Endpoint $x_m = \frac{x_1+x_2}{2}$ $y_m = \frac{y_1+y_2}{2}$ $(x_1,y_1)+(x_2,y_2)$ endpoints (x_m,y_m) ← MP	**1. Find the coordinates of A if $M(-1,2)$ is the midpoint of $\overline{AB}$ and B has the coordinates of $(3,-5)$.** B $(3,-5)$ (x_1,y_1) M $(-1,2)$ (x_m,y_m) A $(?,?)$ $(-5,9)$ $2(-1)=\frac{(3+x_2)}{2}2$ $2(2)=\frac{(-5+y_2)}{2}2$ $-2=3+x_2$ $4=-5+y_2$ $-3\ -3$ $+5\ +5$ $-5=x_2$ $9=y_2$ $(-5,9)$ **2. Find the coordinates of J if $K(-5,10)$ is the midpoint of $\overline{JL}$ and L has the coordinates of $(-8,6)$.** L $(-8,6)$ (x_1,y_1) K $(-5,10)$ (x_m,y_m) J $(?,?)$ $(-2,14)$ $2(-5)=\frac{(-8+x_2)}{2}2$ $2(10)=\frac{(6+y_2)}{2}2$ $-10=-8+x_2$ $20=6+y_2$ $+8\ +8$ $-6\ -6$ $-2=x_2$ $14=y_2$ $(-2,14)$
More Midpoint Examples (Algebra)	**3. If P is the midpoint of $\overline{XY}$, $XP=8x-2$ and $PY=12x-30$, find the value of x. (Draw a diagram!)** X — P — Y $8x-2$ $12x-30$ $8x-2=12x-30$ $-8x\ -8x$ $-2=4x-30$ $+30\ +30$ $\frac{28}{4}=\frac{4x}{4}$ $x=7$
	4. If G is the midpoint of $\overline{FH}$, $FG=14x+25$ and $GH=73-2x$, find FH. (Draw a diagram!) F — G — H $14x+25$ $73-2x$ $14x+25=73-2x$ $+2x\ +2x$ $16x+25=73$ $-25\ -25$ $\frac{16x}{16}=\frac{48}{16}$ $x=3$ $14(3)+25$ $73-2(3)$ $42+25$ $73-6$ 67 67 134
	**5. Using the diagram to the left, if line n bisects $\overline{QR}$, find QP.** $3x+5=5x-19$ $-3x\ -3x$ $5=2x-19$ $+19\ +19$ $24=2x$ $QP=3(12)+5$ $36+5$ 41