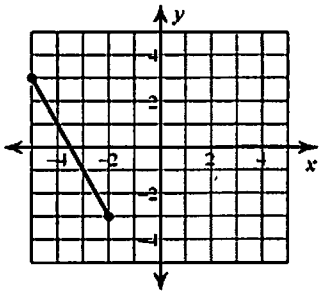
Name:	Class:
Topic:	Date:

Main Ideas/Questions	Notes
Distance Formula	Used to find the distance between two points (x_1, y_1) and (x_2, y_2)
	Formula: $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$
Examples	1. Find the distance between the two points on the graph.  $(-5,3)$ and $(-2,-3)$ $d = \sqrt{(-3-3)^2+(-2--5)^2}$ $= \sqrt{36+9}$ $= \sqrt{45}$ ≈ 6.7
	2. Find AB given $A(-4, 1)$ and $B(3, -1)$. $d = \sqrt{(-1-1)^2+(3--4)^2}$ $= \sqrt{4+49}$ $= \sqrt{53} \approx 7.3$
	3. Find EF given $E(-7, -2)$ and $F(11, 3)$ $d = \sqrt{(11--7)^2+(3--2)^2}$ $= \sqrt{324+25}$ $= \sqrt{349} \approx 18.7$
Midpoint Formula	Used to find the midpoint between two points (x_1, y_1) and (x_2, y_2)
	Formula: $MP = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
	4. Find the midpoint of $\overline{GH}$ given $G(7, -5)$ and $H(9, -1)$. $MP = \left(\frac{7+9}{2}, \frac{-5+-1}{2}\right) = \left(\frac{16}{2}, \frac{-6}{2}\right) = (8, -3)$
	5. Find the midpoint of $\overline{AB}$ given A(-7, 4) and B(3, -4). $MP = \left(\frac{-7+3}{2}, \frac{4+-4}{2}\right) = \left(\frac{-4}{2}, \frac{0}{2}\right) = (-2, 0)$

Finding a Missing Endpoint

6. Find the coordinates of A if $M(-1, 2)$ is the midpoint of $\overline{AB}$ and B has coordinates of (3, -5).

$-1 = \frac{3+x}{2}$ $\quad 2 = \frac{-5+y}{2}$

$-2 = 3+x$ $\quad 4 = -5+y$ $\quad A = \boxed{(-5, 9)}$

$-5 = x$ $\quad 9 = y$

7. Find the coordinates of J if $K(-5, 10)$ is the midpoint of $\overline{JL}$ and L has coordinates of (-8, 6).

$-5 = \frac{-8+x}{2}$ $\quad 10 = \frac{6+y}{2}$

$-10 = -8 + x$ $\quad 20 = 6 + y$ $\quad J = \boxed{(-2, 14)}$

$-2 = x$ $\quad 14 = y$

8. Find the coordinates of R if $Q(-1, 3)$ is the midpoint of $\overline{PR}$ and P has coordinates of (5, 6).

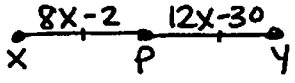
$-1 = \frac{5+x}{2}$ $\quad 3 = \frac{6+y}{2}$

$-2 = 5 + x$ $\quad 6 = 6 + y$ $\quad R = \boxed{(-7, 0)}$

$-7 = x$ $\quad 0 = y$

More Practice with Algebra

9. If P is the midpoint of $\overline{XY}$, $XP = 8x - 2$, and $PY = 12x - 30$, find the value of x.



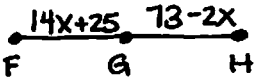
$8x - 2 = 12x - 30$

$-2 = 4x - 30$

$28 = 4x$

$\boxed{x = 7}$

10. If G is the midpoint of $\overline{FH}$, $FG = 14x + 25$, and $GH = 73 - 2x$, find FH.



$14x + 25 = 73 - 2x$

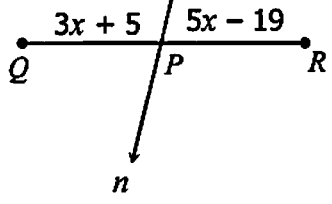
$16x + 25 = 73$

$16x = 48$

$x = 3$

FG: $14(3) + 25 = 67$ $\quad$ FH: $2(67) = \boxed{134}$

11. Using the diagram to the left, if line n bisects $\overline{QR}$, find QP.



$3x + 5 = 5x - 19$

$5 = 2x - 19$

$24 = 2x$

$x = 12$

QP: $3(12) + 5$

$= \boxed{41}$