Notes 1.8 – The Coordinate Plane

1. Distance Formula	1. Use to find the distance between 2 points on the coordinate plane.
$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ (5, 2) (-4, -1) x_1 y_1 x_2 y_2 $d=\sqrt{(-4-5)^2+(-1-2)^2}$ $=\sqrt{(-9)^2+(-3)^2}=\sqrt{81+9}=\sqrt{90}$ $=9.5$	Formula: Example: Find the distance between T(5, 2) and R(-4, -1) to the nearest tenth. x_1 y_1 x_2 y_2 90 → 9, 10 → 3, 3, 5, 2 $3\sqrt{10}$ Example:
2. Midpoint of a segment	2. The average or mean of the coordinates of the endpoints.
$M=\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ Q(3, 5) , S(7, -9) x_1 y_1 x_2 y_2 $\left(\frac{3+7}{2}, \frac{5+-9}{2}\right)$ $(5, -2)$	Formula: Example: QS has endpoints Q(3, 5) and S(7, -9). Find the coordinates of its midpoint M.
(-3, -2) +6 +6 (3, 4) (9, 10) +6 +6	Example: The midpoint of AB is M(3, 4). One endpoint is A(-3, -2). Find the coordinate of the other endpoint B. x_1 y_1 $(3,4)=\left(\frac{-3+x_2}{2}, \frac{-2+y_2}{2}\right)$

$(9, 10)$
x_2 y_2

$\frac{3}{1}=\frac{-3+x_2}{2}$
$6=-3+x_2$
$9=x_2$

$\frac{4}{1}=\frac{-2+y_2}{2}$
$8=-2+y_2$
$10=y_2$