

1. (a) If  $A$  is in Quadrant I and  $B$  is in Quadrant II, where in the plane could the midpoint of  $\overline{AB}$  be?  
(b) If  $A$  is on the negative  $y$ -axis and  $B$  is in Quadrant II, where in the plane could the midpoint of  $\overline{AB}$  be?  
(c) If  $A$  is in Quadrant III and  $B$  is in Quadrant I, where in the plane could the midpoint of  $\overline{AB}$  be?
  
2. (a) If  $A$  is in Quadrant I and the midpoint of  $\overline{AC}$  is on the positive  $x$ -axis, where in the plane could point  $C$  be?  
(b) If  $A$  is on the negative  $y$ -axis and the midpoint of  $\overline{AC}$  is on the negative  $x$ -axis, where in the plane could point  $C$  be?
  
3. If  $A$  is on the positive  $y$ -axis and the midpoint of  $\overline{AC}$  is on the positive  $x$ -axis, while the midpoint of  $\overline{AD}$  is on the negative  $x$ -axis, where in the plane could the midpoint of  $\overline{CD}$  be?
  
4. (a) If  $X = (4, 7)$  and  $Y = (-3, 8)$ , find the coordinates of the midpoint of  $\overline{XY}$ .  
(b) If  $X = (2, 9)$  and  $Y = (-3, 4)$ , find the coordinates of the point that's two fifths of the way from  $X$  to  $Y$ .  
(c) If  $X = (-10, 12)$  and  $Y = (90, 72)$ , find the coordinates of the point that's  $\frac{7}{10}$  of the way from  $Y$  back to  $X$ .
  
5. (a) If  $X = (2, 9)$  and the midpoint of  $\overline{XY}$  is  $(-3, 8)$ , find the coordinates of  $Y$ .  
(b) If  $X = (-2, 0)$  and the midpoint of  $\overline{XY}$  is  $(3, 4)$ , find the coordinates of  $Y$ .  
(c) If  $X = (4, 7)$  and  $(-1, 0)$  is one third of the way from  $X$  to  $Y$ , find  $Y$ .  
(d) If  $X = (-10, 12)$  and  $(2, 0)$  is three fifths of the way from  $X$  to  $Z$ , find  $Z$ .
  
6. (a) Find a point that's twice as far from  $(6, -2)$  as  $(5, 1)$  is, but in the opposite direction.  
(b) Find a point that is half as far from  $(0, -3)$  as  $(6, 2)$  is, but in the opposite direction.

1. (a) QI, QII, or the positive  $y$ -axis  
(b) QII, QIII, or the negative  $x$ -axis  
(c) anywhere
2. (a) QIII, QIV, or the negative  $y$ -axis  
(b) QII
3. QIII, QIV, or the negative  $y$ -axis
4. (a) (0.5, 7.5)  
(b) (0, 7)  
(c) (20, 30)
5. (a) (-8, 7)  
(b) (8, 8)  
(c) (-11, -14)  
(d) (10, -8)
6. (a) (8, -8)  
(b) (-3, -5.5)