Missing Coordinates

Example : The endpoints of the line segment $(3, u)$ and $(v, -2)$ and midpoint $(-1, 0)$.
Find the value of variables.

$$\textbf{Midpoint} = \left(\frac{\textbf{x}_1 + \textbf{x}_2}{\textbf{2}}, \frac{\textbf{y}_1 + \textbf{y}_2}{\textbf{2}}\right) \Rightarrow (-1, 0) = \left(\frac{3+v}{2}, \frac{u-2}{2}\right)$$

$$\Rightarrow -1 = \left(\frac{3+v}{2}\right), \quad 0 = \left(\frac{u-2}{2}\right)$$

$$\Rightarrow -2 = 3+v, \quad 0 = u-2 \Rightarrow \textbf{u = 2 ; v = -5}$$

Find the value of variable for the given endpoints and the midpoint of the line segments.

1) Endpoints : $(m, 6)$ and $(3, 2)$

   Midpoint : $(4, n)$

   m = ☐   n = ☐

2) Endpoints : $(-3, q)$ and $(p, 8)$

   Midpoint : $(-1, 3)$

   p = ☐   q = ☐

3) Endpoints : (b, a) and $(0, -4)$

   Midpoint : $(-5, -4)$

   a = ☐   b = ☐

4) Endpoints : $(9, 12)$ and $(-9, h)$

   Midpoint : $(g, 3)$

   g = ☐   h = ☐

5) Endpoints : $(6, u)$ and $(v, -3)$

   Midpoint : $(4, -7)$

   u = ☐   v = ☐

6) Endpoints : $(d, 0)$ and $(1, 0)$

   Midpoint : $(2, c)$

   d = ☐   c = ☐

Missing Coordinates

Answer key

Example : The endpoints of the line segment (3, u) and (v, –2) and midpoint (–1, 0).
Find the value of variables.

$$\textbf{Midpoint} = \left(\frac{\textbf{x}_1 + \textbf{x}_2}{\textbf{2}}, \frac{\textbf{y}_1 + \textbf{y}_2}{\textbf{2}}\right) \Rightarrow (-1, 0) = \left(\frac{3 + v}{2}, \frac{u - 2}{2}\right)$$

$$\Rightarrow -1 = \left(\frac{3 + v}{2}\right), \quad 0 = \left(\frac{u - 2}{2}\right)$$

$$\Rightarrow -2 = 3 + v, \quad 0 = u - 2 \Rightarrow \textbf{u = 2 ; v = –5}$$

Find the value of variable for the given endpoints and the midpoint of the line segments.

1) Endpoints : (m, 6) and (3, 2)

   Midpoint : (4, n)

   m = **5**   n = **4**

2) Endpoints : (–3, q) and (p, 8)

   Midpoint : (–1, 3)

   p = **1**   q = **–2**

3) Endpoints : (b, a) and (0, –4)

   Midpoint : (–5, –4)

   a = **–4**   b = **–10**

4) Endpoints : (9, 12) and (–9, h)

   Midpoint : (g, 3)

   g = **0**   h = **–6**

5) Endpoints : (6, u) and (v, –3)

   Midpoint : (4, –7)

   u = **–11**   v = **2**

6) Endpoints : (d, 0) and (1, 0)

   Midpoint : (2, c)

   d = **3**   c = **0**