Midpoint Formula

There are two ways to determine the midpoint of a segment: draw it out on the coordinate plane and visually find the middle , or use the midpoint formula. If you’re careful, the graph will find you the midpoint.



However, the fastest way to determine a midpoint is the midpoint formula*:* $Midpoint=\left(\frac{x\_{1}+x\_{2}}{2}, \frac{y\_{1}+y\_{2}}{2}\right)$. All you have to do is add your *x*-values and divide by two, then add the *y*-values and divide by 2. For example, if I want the midpoint of (-4, 2) and (3, 4), as in the image above, I plug it in: $Midpoint=\left(\frac{x+x}{2}=\frac{-4+3}{2}, \frac{y+y}{2}=\frac{2+4}{2}\right)=\left(-\frac{1}{2},\frac{6}{2}\right)=$

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| Midpoint Formula |
| $$Midpoint = \left(\frac{x\_{1}+x\_{2}}{2}, \frac{y\_{1}+y\_{2}}{2}\right)$$ |

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| **EXAMPLE**Find the midpoint of the line segment with endpoints $(3, 5)$ and $(9, 2)$.$$Midpoint = \left(\frac{x\_{1}+x\_{2}}{2}, \frac{y\_{1}+y\_{2}}{2}\right)$$x’s: 3 & 9 y’s: 5 & 2$$Midpoint = \left(\frac{3+9}{2}, \frac{5+2}{2}\right)$$$$Midpoint = \left(\frac{12}{2}, \frac{7}{2}\right)$$$$Midpoint = $$ | **EXAMPLE**Find the midpoint of the line segment with endpoints $(4, -1)$ and $(8, 7)$.$$Midpoint = \left(\frac{x\_{1}+x\_{2}}{2}, \frac{y\_{1}+y\_{2}}{2}\right)$$x’s: 4 & 8 y’s: -1 & 7$$Midpoint = \left(\frac{4+8}{2}, \frac{-1+7}{2}\right)$$$$Midpoint = \left(\frac{12}{2}, \frac{6}{2}\right)$$$$Midpoint = $$ | **EXAMPLE**Find the midpoint of the line segment with endpoints $(11, 4)$ and $(5, 4)$.$$Midpoint = \left(\frac{x\_{1}+x\_{2}}{2}, \frac{y\_{1}+y\_{2}}{2}\right)$$x’s: 11 & 5 y’s: 4 & 4$$Midpoint = \left(\frac{11+5}{2}, \frac{4+4}{2}\right)$$$$Midpoint = \left(\frac{16}{2}, \frac{8}{2}\right)$$$$Midpoint = $$ |
| 1. Find the midpoint of the line segment with endpoints $(0, 5)$ and $(-8, 8)$. | 2. Find the midpoint of the line segment with endpoints $(4, 12)$ and $(6, 4)$. | 3. Find the midpoint of the line segment with endpoints $(-5, -3)$ and $(5, -1)$. |
| 4. Find the midpoint of the line segment with endpoints $(8, 8)$ and $(3, 3)$. | 5. Find the midpoint of the line segment with endpoints $(-2, 9)$ and $(4, 1)$. | 6. Find the midpoint of the line segment with endpoints $(-7, 2)$ and $(-2, -10)$. |
| 7. Find the midpoint of the line segment with endpoints $(5, 2)$ and $(13, 17)$. | 8. Find the midpoint of the line segment with endpoints $(-1, 6)$ and $(8, 4)$. | 9. Find the midpoint of the line segment with endpoints $(7, 2)$ and $(15, 6)$. |
| 10. Determine the midpoint of $(1, 2)$ and $(3, 4)$. | 11. Determine the midpoint of $(-5, -3)$ and $(1,-1)$. | 12. Determine the midpoint of $(4, 6)$ and $(-3, 7)$. |
| 13. Determine the midpoint of $(-6, 5)$ and $(-3, 14)$. | 14. Determine the midpoint of $(7, 4)$ and $(7, 2)$. | 15. Determine the midpoint of $(8, 6)$ and $(-1, 15)$. |

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| 16. $R(3, -9)$ & $S(15, -6)$a. Determine $RS$.b. Determine the midpoint of $\overbar{RS}$. | 17. $A\left(-7, -5\right)$ & $B(-7, 15)$a. Determine $AB$. b. Determine the midpoint of $\overbar{AB}$. | 18. $L(2, 10)$ & $M(-4, 2)$a. Determine $LM$.b. Determine the midpoint of $\overbar{LM}$. |