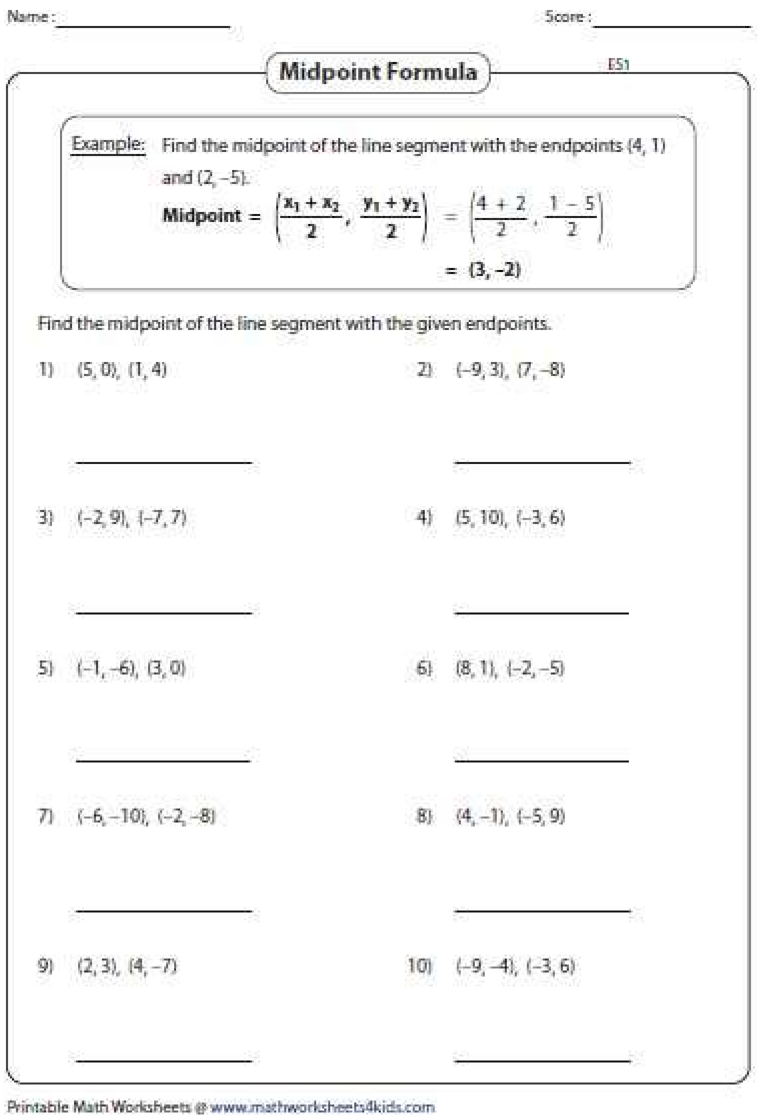
13 Midpoint And Distance Formulas Answer Key



Name : ______________ Score : ______________

Midpoint Formula

ES1

Example: Find the midpoint of the line segment with the endpoints (4, 1) and (2, –5).

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{4 + 2}{2}, \frac{1 - 5}{2}\right) = (3, -2)$$

Find the midpoint of the line segment with the given endpoints.

1) (5, 0), (1, 4) ______________

2) (–9, 3), (7, –8) ______________

3) (–2, 9), (–7, 7) ______________

4) (5, 10), (–3, 6) ______________

5) (–1, –6), (3, 0) ______________

6) (8, 1), (–2, –5) ______________

7) (–6, –10), (–2, –8) ______________

8) (4, –1), (–5, 9) ______________

9) (2, 3), (4, –7) ______________

10) (–9, –4), (–3, 6) ______________

Printable Math Worksheets @ www.mathworksheets4kids.com

13 midpoint and distance formulas answer key is an essential topic in geometry that allows students and professionals alike to calculate the midpoint between two points in a coordinate plane and determine the distance between those points. Understanding these formulas is crucial in various fields, including mathematics, engineering, and computer graphics. In this article, we will delve into the midpoint and distance formulas, provide examples, and offer an answer key for 13 practice problems.

Understanding the Midpoint Formula

The midpoint formula is used to find the midpoint between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ in a two-dimensional Cartesian coordinate system. The formula is given by:

$$
M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)
$$

How to Use the Midpoint Formula

To find the midpoint:

1. Identify the coordinates of the two points.
2. Plug the coordinates into the formula.
3. Calculate the average of the x-coordinates and the y-coordinates separately.

Example

Suppose we have two points $A(2, 3)$ and $B(4, 7)$. To find the midpoint M:

1. Identify coordinates: $x_1 = 2, y_1 = 3, x_2 = 4, y_2 = 7$.
2. Plug into the formula:

$$
M = \left(\frac{2 + 4}{2}, \frac{3 + 7}{2} \right) = \left(\frac{6}{2}, \frac{10}{2} \right) = (3, 5)
$$

Thus, the midpoint M is $(3, 5)$.

Understanding the Distance Formula

The distance formula calculates the distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ in the coordinate plane. The formula is expressed as:

$$
d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}
$$

How to Use the Distance Formula

To find the distance:

1. Identify the coordinates of the two points.
2. Subtract the coordinates to find the differences.
3. Square the differences.
4. Add the squared differences.
5. Take the square root of the sum.

Example

Using the previous points $A(2, 3)$ and $B(4, 7)$, we can find the distance d:

1. Identify coordinates: $x_1 = 2, y_1 = 3, x_2 = 4, y_2 = 7$.
2. Calculate differences:

$$
(x_2 - x_1) = (4 - 2) = 2
$$

$$
(y_2 - y_1) = (7 - 3) = 4
$$

3. Square the differences:

\[

(2)^2 = 4
\]
\[
(4)^2 = 16
\]

4. Add the squared differences:

\[
4 + 16 = 20
\]

5. Take the square root:

\[
d = \sqrt{20} = 2\sqrt{5} \approx 4.47
\]

Thus, the distance \(d\) is approximately \(4.47\) units.

Practice Problems

To reinforce the understanding of the midpoint and distance formulas, here are 13 practice problems along with their answers.

Midpoint Problems

1. Find the midpoint of \(A(1, 2)\) and \(B(3, 4)\).
2. Find the midpoint of \(A(-1, -5)\) and \(B(3, 1)\).
3. Find the midpoint of \(A(0, 0)\) and \(B(8, 6)\).
4. Find the midpoint of \(A(-2, 4)\) and \(B(2, -4)\).
5. Find the midpoint of \(A(5, -3)\) and \(B(1, 5)\).
6. Find the midpoint of \(A(7, 2)\) and \(B(3, 6)\).
7. Find the midpoint of \(A(-3, -7)\) and \(B(1, 5)\).

Distance Problems

8. Calculate the distance between \(A(1, 1)\) and \(B(4, 5)\).
9. Calculate the distance between \(A(2, -3)\) and \(B(-2, 1)\).
10. Calculate the distance between \(A(-1, 2)\) and \(B(3, 4)\).
11. Calculate the distance between \(A(0, 0)\) and \(B(-4, -3)\).
12. Calculate the distance between \(A(1, 2)\) and \(B(1, 5)\).
13. Calculate the distance between \(A(3, 7)\) and \(B(6, 1)\).

Answer Key

Midpoint Answers

1. \(M = (2, 3)\)
2. \(M = (1, -2)\)
3. \(M = (4, 3)\)
4. \(M = (0, 0)\)
5. \(M = (3, 1)\)
6. \(M = (5, 4)\)

7. \(M = (-1, -1)\)

Distance Answers

8. \(d = \sqrt{(4-1)^2 + (5-1)^2} = \sqrt{9 + 16} = \sqrt{25} = 5\)
9. \(d = \sqrt{(-2-2)^2 + (1+3)^2} = \sqrt{16 + 16} = \sqrt{32} = 4\sqrt{2} \approx 5.66\)
10. \(d = \sqrt{(3+1)^2 + (4-2)^2} = \sqrt{16 + 4} = \sqrt{20} = 2\sqrt{5} \approx 4.47\)
11. \(d = \sqrt{(-4-0)^2 + (-3-0)^2} = \sqrt{16 + 9} = \sqrt{25} = 5\)
12. \(d = \sqrt{(1-1)^2 + (5-2)^2} = \sqrt{0 + 9} = 3\)
13. \(d = \sqrt{(6-3)^2 + (1-7)^2} = \sqrt{9 + 36} = \sqrt{45} = 3\sqrt{5} \approx 6.71\)

Conclusion

Understanding the **13 midpoint and distance formulas answer key** is essential for solving problems in geometry related to points in a coordinate plane. The midpoint formula helps determine the center point between two points, while the distance formula provides the length between them. By practicing with various problems, students can gain confidence in applying these formulas effectively.

Frequently Asked Questions

What is the midpoint formula?

The midpoint formula is used to find the midpoint (M) between two points (x1, y1) and (x2, y2) in a coordinate plane. It is given by M = ((x1 + x2) / 2, (y1 + y2) / 2).

How do you calculate the distance between two points using the distance formula?

The distance formula calculates the distance (d) between two points (x1, y1) and (x2, y2) using the formula $d = \sqrt{((x2 - x1)^2 + (y2 - y1)^2)}$.

Can you provide an example of using the midpoint formula?

Certainly! For points A(2, 3) and B(4, 7), the midpoint M = ((2 + 4) / 2, (3 + 7) / 2) = (3, 5).

What is the importance of the distance formula in geometry?

The distance formula is crucial in geometry as it allows us to find the length of line segments, determine if points are equidistant, and analyze various geometric shapes.

How do you derive the distance formula from the Pythagorean theorem?

The distance formula is derived from the Pythagorean theorem by considering the difference in x-coordinates as one leg of a right triangle and the difference in y-coordinates as the other leg, leading to $d = \sqrt{((\Delta x)^2 + (\Delta y)^2)}$.

What are some common mistakes when using the midpoint and distance formulas?

Common mistakes include forgetting to square the differences in the distance formula, miscalculating the average in the midpoint formula, and mixing up x and y coordinates.

Find other PDF article:
https://soc.up.edu.ph/43-block/files?dataid=NEH59-4843&title=ninja-creami-vegan-protein-ice-cream.pdf

13 Midpoint And Distance Formulas Answer Key

1加十三手机（一加13）怎么样？体验3天优缺点测评
Nov 4, 2024 · 一加 13 高通骁龙 8 至尊版 6000mAh 冰川电池 AI手机 旗舰影像性能手机 1加十三手机（一加13）怎么样？体验3天优缺点测评 本文将为你选购做出精确建议，结合实际优惠力 …

都说13代、14代酷睿处理器缩肛，具体是什么情况？ - 知乎
目前的情况是英特尔酷睿13，14代处理器普遍有缩肛暗伤，不能长期高负载工作，否则稳定性会下降不可修复，因此在编译Shader时候，英特尔酷睿13，14代处理器会经历一次极为巨大的考 …

2025年运动相机推荐 | Gopro 13、大疆action 5 Pro、Insta360 运动 …
Jan 14, 2025 · 运动相机在这几年不断的更新迭代、不仅在功能上不断升级使用场景也发生了很大的变化，从纯粹的极限运动慢慢开始向大众场景辐射。Gopro、Insta360、大疆这些运动相机 …

i5-12450h相当于什么水平？都2025年了i5-12450H性能够用吗？现 …
May 19, 2025 · 12450H对比12代和13代标压i5处理器：同样向高级别对比，还是对比十二代i5-12500H和十三代i5-13500H这两代的核心标压处理，整体跑分有一些差距的，这主要是因为核 …

python - Errno 13 Permission denied - Stack Overflow
Jul 16, 2020 · Errno 13 Permission denied [duplicate] Asked 8 years, 6 months ago Modified 2 years, 1 month ago Viewed 483k times

2025年国产各品牌平板电脑推荐（7月份更新）平板电脑选购指南
5 days ago · 近期更新：已更新7月15日发布的荣耀平板GT2 Pro。已更新7月2日发布的荣耀MagicPad3。已更新6月26日发布的红米K Pad及小米平板7S Pro。已更新5月22日发布的小米 …

带圈圈的序号1到30 - 百度知道
带圈序号1-30：（可复制）⓪①②③④⑤⑥⑦⑧⑨⑩⑪⑫⑬⑭⑮⑯⑰⑱⑲⑳㉑㉒㉓㉔㉕㉖㉗㉘㉙㉚扩展，31-50，10-80：（可复制）㉛㉜㉝㉞㉟㊱㊲㊳㊴㊵ …

2025年笔记本电脑CPU天梯图（7月）
Jul 1, 2025 · 2025年笔记本电脑CPU天梯图，笔记本电脑CPU排行，是按照CPU的跑分进行排序，进行综合性能对比。可以一定程度上反应CPU的性能优劣，方便进行笔记本电脑CPU对比。

Jan、Mar、Feb、Apr、May、Jun是什么意思 - 百度知道
Jan、Mar、Feb、Apr、May、Jun是什么意思Jan、Feb、Mar、Apr、May、Jun 是一些缩写的月份名称，分别对应一年中的1月、2月、3月、4月、5月和6月。它们来自于英语的月份名称缩写：

Newest Questions - Stack Overflow
Ask questions, find answers and collaborate at work with Stack Overflow for Teams. Try Teams for free Explore Teams

1加十三手机（一加13）怎么样？体验3天优缺点测评

Nov 4, 2024 · 一加 13 高通骁龙 8 至尊版 6000mAh 冰川电池 AI手机 旗舰影像性能手机 1加十三手机（一加13）怎么样？体验3天优缺点测评 本文将为你选购做出精确建议，结合实际优惠力 ...

都说13代、14代酷睿处理器缩肛，具体是什么情况？ - 知乎

目前的情况是英特尔酷睿13，14代处理器普遍有缩肛暗伤，不能长期高负载工作，否则稳定性会下降不可修复，因此在编译Shader时候，英特尔酷睿13，14代处理器会经历一次极为巨大的考 ...

2025年运动相机推荐 | Gopro 13、大疆ation 5 Pro、Insta360 运 ...

Jan 14, 2025 · 运动相机在这几年不断的更新迭代、不仅在功能上不断升级使用场景也发生了很大的变化，从纯粹的极限运动慢慢开始向大众场景辐射。Gopro、Insta360、大疆这些运动相机 ...

i5-12450h相当于什么水平？都2025年了i5-12450H性能够用吗？ ...

May 19, 2025 · 12450H对比12代和13代标压i5处理器：同样向高级别对比，还是对比十二代i5-12500H和十三代i5-13500H这两代的核心标压处理，整体跑分有一些差距的，这主要是因为核 ...

python - Errno 13 Permission denied - Stack Overflow

Jul 16, 2020 · Errno 13 Permission denied [duplicate] Asked 8 years, 6 months ago Modified 2 years, 1 month ago Viewed 483k times

2025年国产各品牌平板电脑推荐（7月份更新）平板电脑选购指南

5 days ago · 近期更新：已更新7月15日发布的荣耀平板GT2 Pro。已更新7月2日发布的荣耀MagicPad3。已更新6月26日发布的红米K Pad及小米平板7S Pro。已更新5月22日发布的小米 ...

带圈圈的序号1到30 - 百度知道

带圈序号1-30：（可复制）⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ 扩展，31-50，10-80：（可复制）㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺ ...

2025年笔记本电脑CPU天梯图（7月）

Jul 1, 2025 · 2025年笔记本电脑CPU天梯图，笔记本电脑CPU排行，是按照CPU的跑分进行排序，进行综合性能对比。可以一定程度上反应CPU的性能优劣，方便进行笔记本电脑CPU对比。

Jan、Mar、Feb、Apr、May、Jun是什么意思 - 百度知道

Jan、Mar、Feb、Apr、May、Jun是什么意思Jan、Feb、Mar、Apr、May、Jun 是一些缩写的月份名称，分别对应一年中的1月、2月、3月、4月、5月和6月。它们来自于英语的月份名称缩写：

Newest Questions - Stack Overflow

Ask questions, find answers and collaborate at work with Stack Overflow for Teams. Try Teams for free Explore Teams

Unlock the secrets of geometry with our comprehensive guide on the 13 midpoint and distance formulas answer key. Discover how to master these essential concepts today!

Back to Home