

Coordinate Geometry Basics

Printable teaching and practice sheet

Chapter 4 | Module 15 | Student Book pages 150-161 | Suggested time: 50 minutes | 20 marks



Name: _____ Class: _____ Date: _____

Learning goals

- Explain and apply directed division on a line with valid conditions and clear reasoning.
- Explain and apply distance between points with valid conditions and clear reasoning.
- Explain and apply section formula with valid conditions and clear reasoning.

Quick reference

Directed division on a line	Internal and external division use directed ratios to locate a point relative to two endpoints.
Distance between points	The distance is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
Section formula	A point dividing AB internally in ratio m:n is a weighted average of endpoint coordinates.

Worked example

For A(1,-2) and B(5,1), $AB = \sqrt{(5-1)^2 + (1-(-2))^2} = \sqrt{25} = 5$.

Graduated practice

Answer without viewing the key. Show complete working for short-response questions.

1. On a number line, P divides A=2 to B=10 internally with AP:PB=1:3. Find P. [1 marks]

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|------|------|
| A) 3 | B) 4 |
| C) 6 | D) 8 |

2. In which quadrant is (-3,4), and what is its reflection in the x-axis? [1 marks]

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|-------------------------|-------------------------|
| A) Quadrant I; (3,4) | B) Quadrant II; (-3,-4) |
| C) Quadrant III; (3,-4) | D) Quadrant IV; (-3,4) |

3. Find the distance between A(1,-2) and B(5,1). [1 marks]

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|------|------|
| A) 3 | B) 4 |
| C) 5 | D) 7 |

4. What is the locus of points equidistant from A(-2,0) and B(2,0)? [1 marks]

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|-----------------|---------------------------|
| A) The x-axis | B) The y-axis, x=0 |
| C) The line y=2 | D) The circle $x^2+y^2=4$ |

5. P divides A(1,2)B(7,8) internally in the ratio AP:PB=2:1. Find P. [1 marks]

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|-----------|-----------|
| A) P(3,4) | B) P(4,5) |
| C) P(5,6) | D) P(6,7) |

6. If M(1,2) is the midpoint of A(-3,5)B, find B. [1 marks]

- | | |
|------------|------------|
| A) B(-1,3) | B) B(4,-3) |
| C) B(5,-1) | D) B(2,-5) |

7. True or false: reflection in the x-axis keeps the x-coordinate and reverses the sign of the y-coordinate. [1 marks]

☐ True ☐ False

8. True or false: every point equidistant from A and B is the midpoint of AB. [1 marks]

☐ True ☐ False

9. On a number line A=2 and B=8. Find P that divides AB externally in the ratio AP:PB=3:1, and verify the ratio. [3 marks]

10. If $P(x,2)$ is equidistant from $A(-1,0)$ and $B(5,4)$, find x . [3 marks]

11. P divides $A(-2,1)B(8,6)$ internally in the ratio $AP:PB=3:2$. Find P . [3 marks]

12. B is the image of $A(-3,4)$ under central symmetry about $M(2,-1)$. Find B and check the midpoint. [3 marks]

Challenge and review

1. Derive the coordinates of P dividing $A(x_1, y_1)B(x_2, y_2)$ internally in the ratio $AP:PB=m:n$ using vectors.
2. Find the centre of the circle through $A(0,0)$, $B(6,0)$ and $C(2,4)$ by using equal distances.
3. Error analysis: a student uses denominator $m+n$ in the external-section formula. Explain why $m-n$ is required and state the condition $m \neq n$.

Follow-up plan

Below 14/20: revisit reflection signs, squared distance, and internal and external section formulas, then retry Questions 2-6 and 9-12. At 14 or above: continue to the online module challenge.