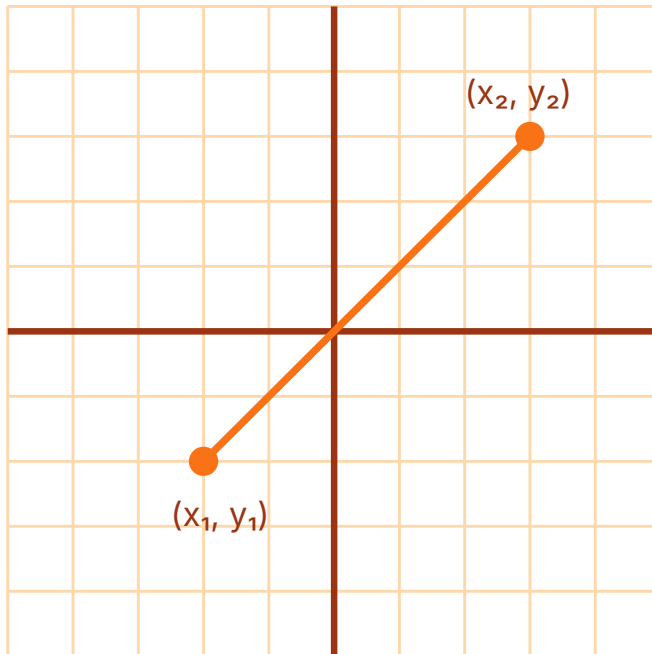


Coordinate Geometry

10th Grade

Distance, midpoint, slope proofs and circle equations on the plane.



Distance

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

Midpoint

$$M = ((x_1 + x_2)/2 , (y_1 + y_2)/2)$$

Slope

$$m = (y_2 - y_1) / (x_2 - x_1)$$

Circle

$$(x - h)^2 + (y - k)^2 = r^2$$

LINE RELATIONSHIPS

Parallel

slopes are equal

$$m_1 = m_2$$

Perpendicular

slopes are negative reciprocals

$$m_1 \times m_2 = -1$$

Collinear

same slope between every pair of points

no triangle

PROVING A SHAPE ON THE GRID

- **Parallelogram** both pairs of opposite sides have equal slopes
- **Rectangle** parallelogram + one pair of adjacent slopes multiply to -1
- **Rhombus** parallelogram + all four side lengths equal
- **Square** rhombus + one right angle
- **Isosceles triangle** two distances equal