Name_____ Date_____
Geometry

Coordinate Geometry Proofs

<u>Important formulas</u> (YOU NEED TO KNOW THESE!)

Slope:

Midpoint:

Distance (length):

Prove a quadrilateral is a:

- parallelogram
- rhombus
- rectangle
- square
- trapezoid
- isosceles trapezoid

<u>THREE PARTS</u>

-Formulate a plan

-Use slope, midpoint, and/or distance formulas to execute plan

-Create concluding statement to justify the proof

Prove a triangle is a:

-right triangle
-isosceles triangle
-equilateral triangle

Coordinate Geometry Proofs
Methods of Proof

Triangles

Isosceles Triangle
-using distance formula, prove that two sides are congruent

Right Triangle
-using slope formula, prove that two sides are perpendicular (right angle)

Equilateral Triangle
-using distance formula, prove that all sides are congruent

Quadrilaterals

Parallelogram
-using distance formula, prove that opposite sides are congruent

Rhombus
-using distance formula, prove that all sides are congruent

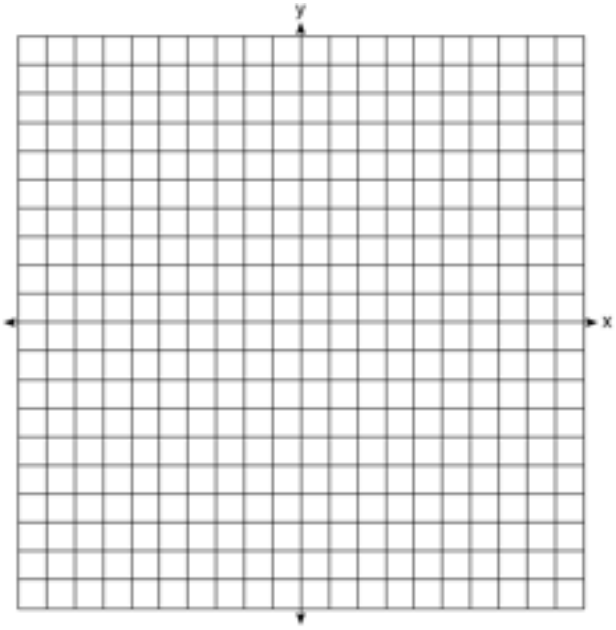
Rectangle
-using distance formula, prove that opposite sides are congruent (parallelogram) and diagonals are congruent

Square
-using distance formula, prove that all sides are congruent
-using slope formula, prove that there are four right angles (perpendicular sides)

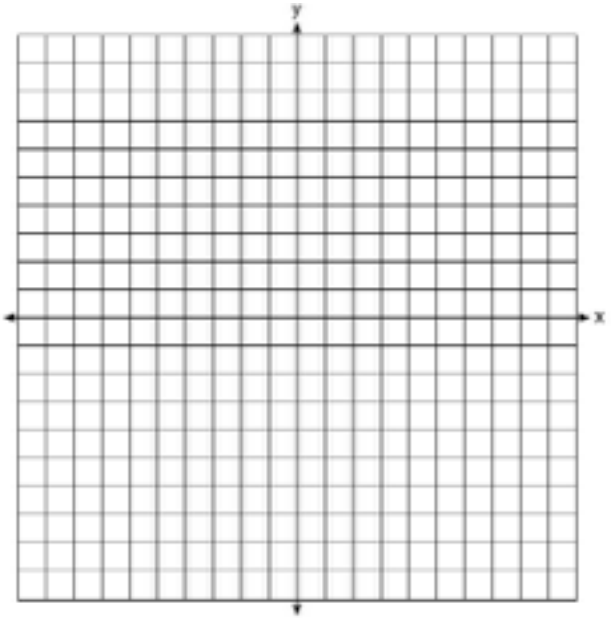
Trapezoid
-using slope formula, prove one pair of sides is parallel (same slope), and the other pair is not (different slope)

Isosceles Trapezoid
-using slope formula, prove one pair of sides is parallel (same slope), and the other pair is not (different slope)
-using distance formula, prove the non-parallel sides are congruent

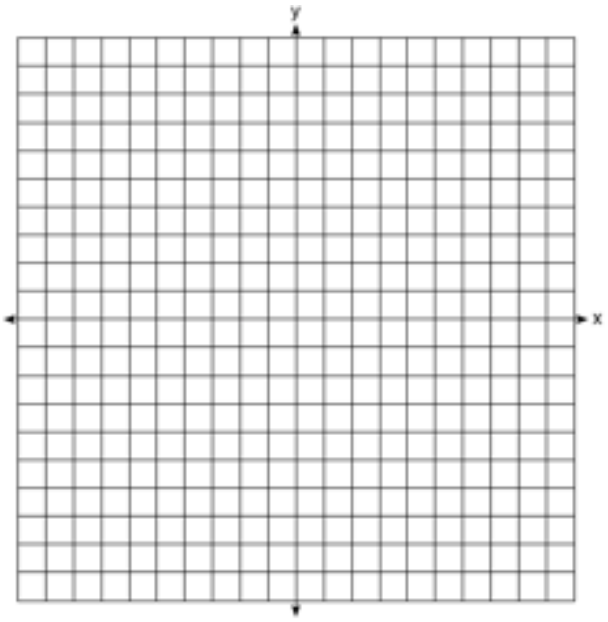
1) Triangle AFN has vertices A(-7, 6), F(-1, 6), and N(-4, 2). Prove triangle AFN is an isosceles triangle.



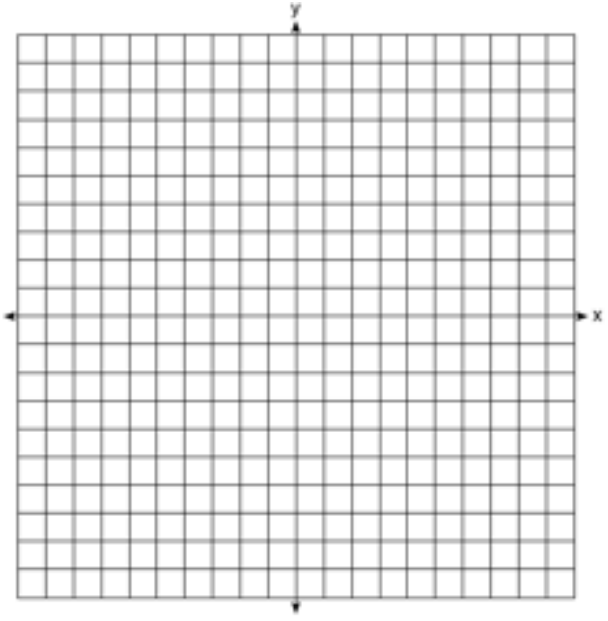
2) Triangle MEP has vertices M(6, 12), E(6, 4), and P(3, 8). Prove triangle MEP is not a right triangle but is isosceles.



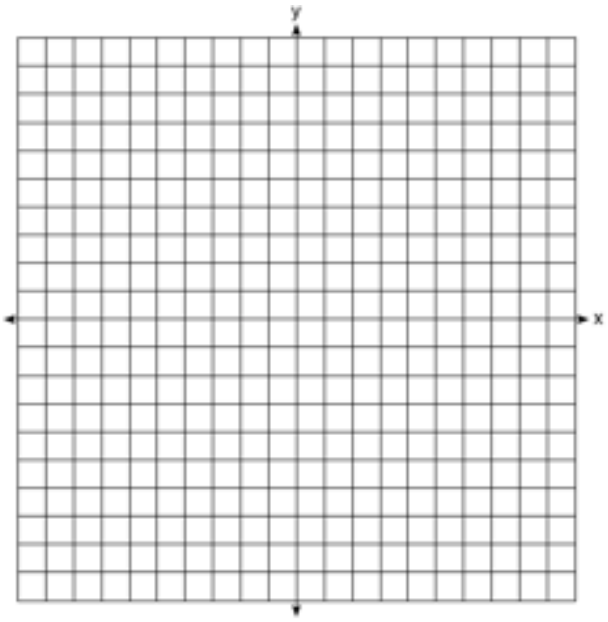
3) The vertices of triangle ABC are A(0, 0), B(2, 3), and C(4, 0). Prove that it is isosceles



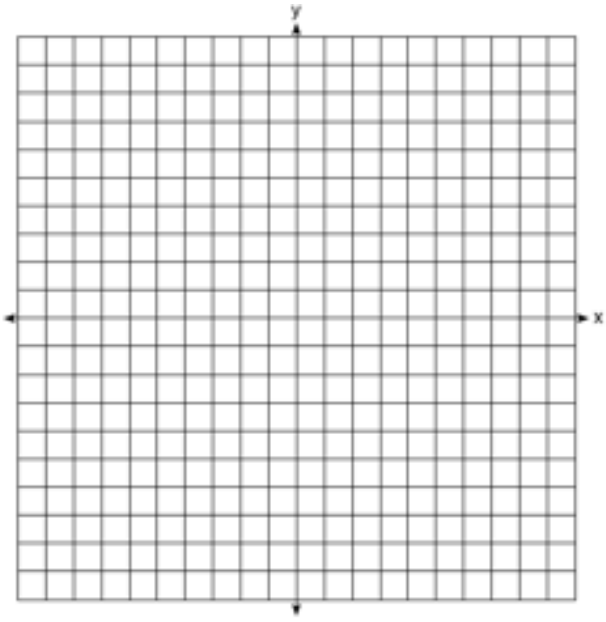
4) Prove that A(1, 1), B(4, 4), and C(6, 2) are the vertices of a right triangle.



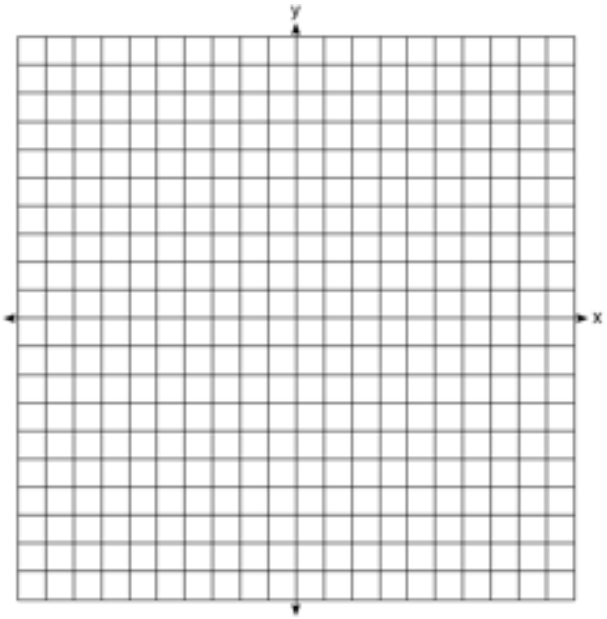
5) The vertices of ΔABC are A(-3,1), B(-2,-1), and C(2,1).
Show that ΔABC is a right triangle



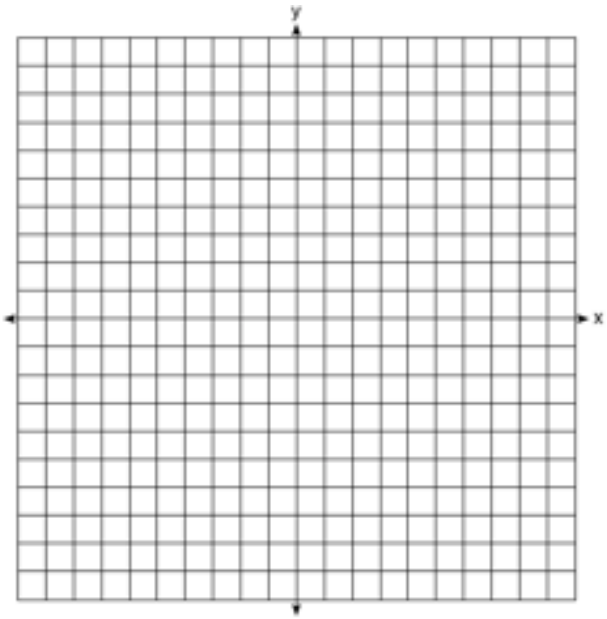
6) The vertices of ΔABC are A(-1,5), B(5,3) and C(1,1).
Prove that ΔABC is an isosceles right triangle.



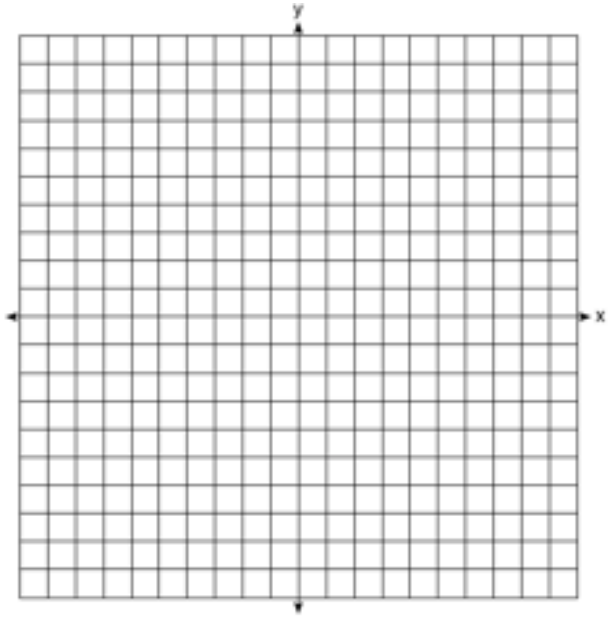
7) Prove that the quadrilateral whose vertices are the points A(-1,1), B(-3,4), C(1,5) and D(3,2) is a parallelogram.



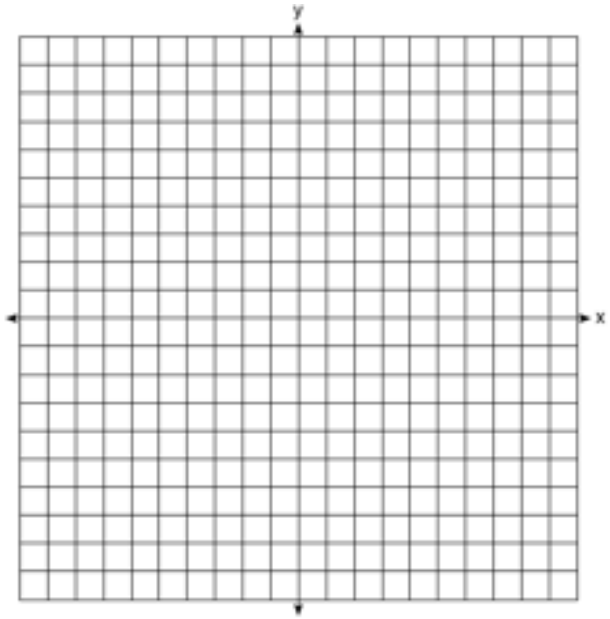
8) Quadrilateral DEFG has vertices at D(3,4), E(8,6), F(9,9) and G(4,7). Prove that DEFG is a parallelogram.



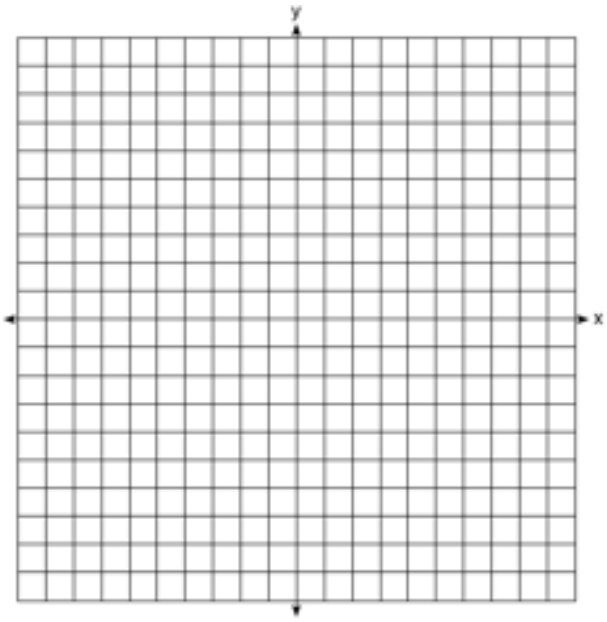
9) Quadrilateral ABCD has vertices A(2, 3), B(10, 3), C(10, -1), and D(2, -1). Prove quadrilateral ABCD is a rectangle



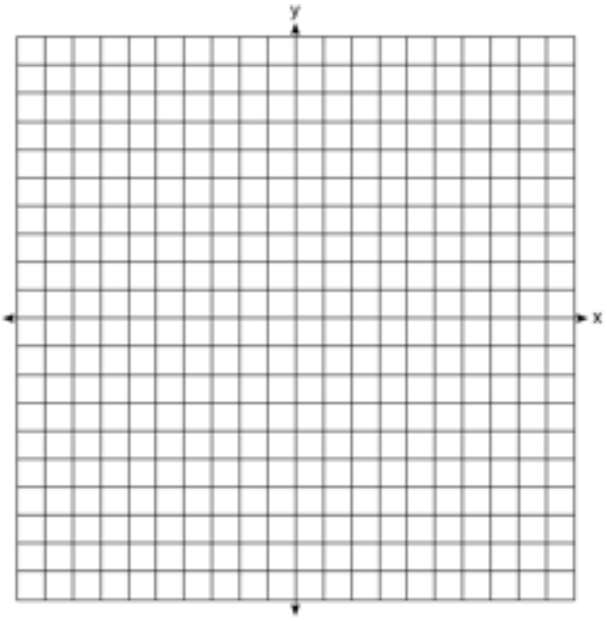
10) The coordinates of the vertices of quadrilateral ABCD are A(-3,-1), B(6,2), C(5,5), and D(-4, 2). Prove that quadrilateral ABCD is a rectangle.



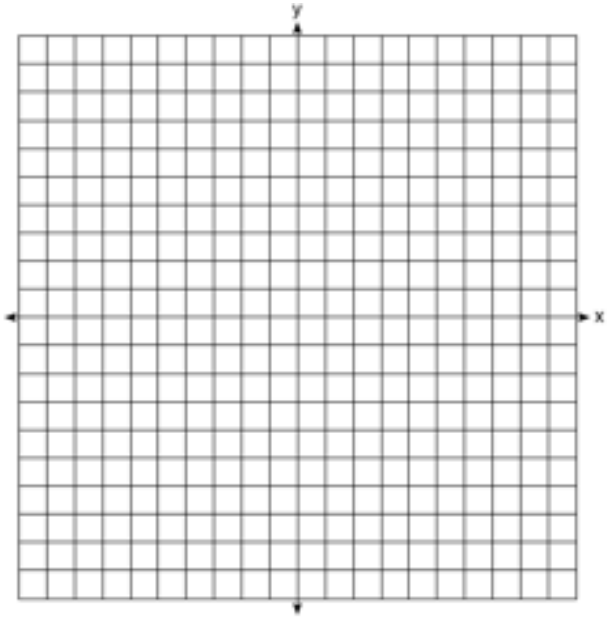
11) Quadrilateral QRST has vertices Q(6, 7), R(11, 7), S(8, 3), T(3, 3). Prove quadrilateral QRST is a rhombus



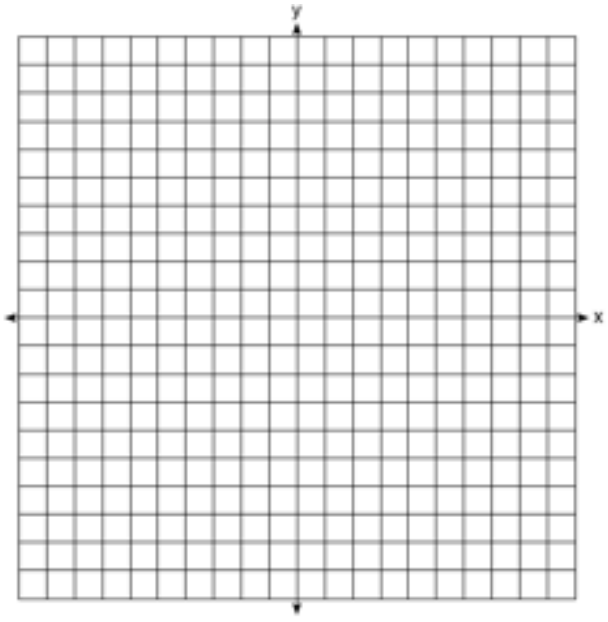
12) Quadrilateral RHOM has vertices R(-3,2), H(2,4), O(0,-1), and M(-5,-3). Using coordinate geometry, prove that RHOM is a rhombus.



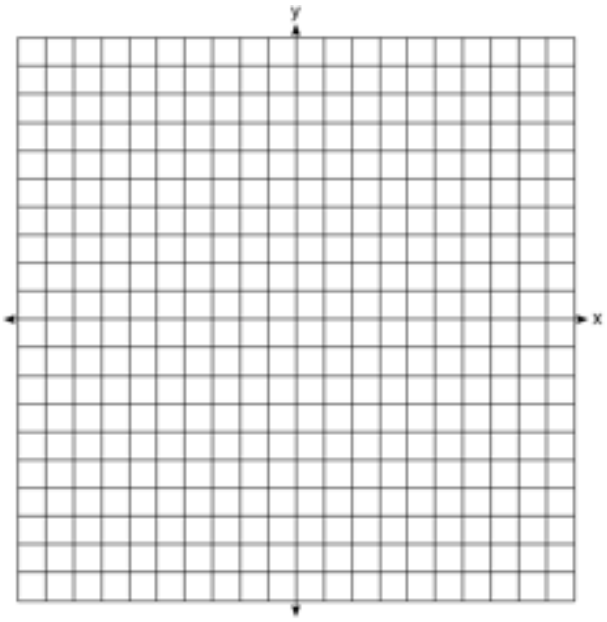
13) The coordinates of the vertices of quadrilateral ABCD are A(4,1), B(1,5), C(-3,2) and D(0,-2). Prove the quadrilateral is a square.



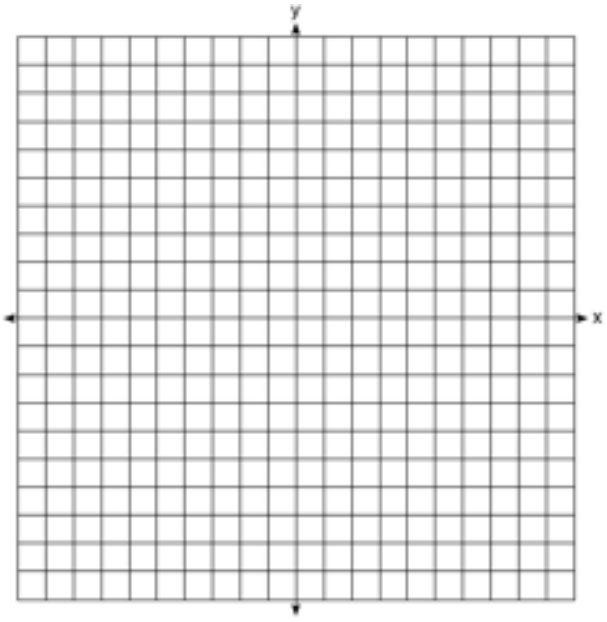
14) Quadrilateral EFGH has vertices E(-7, 0), F(-2, 0), G(-2, -5), and H(-7, -5). Prove quadrilateral EFGH is a square.



15) Quadrilateral JKLM has vertices J(4, 7), K(11, 0), L(7, 0), and M(4, 3). Prove quadrilateral JKLM is an isosceles trapezoid.



16) Quadrilateral TRAP has vertices T(-3,0), R(-3,5), A(6,8), and P(9,4).
Prove that quadrilateral TRAP is an isosceles trapezoid.

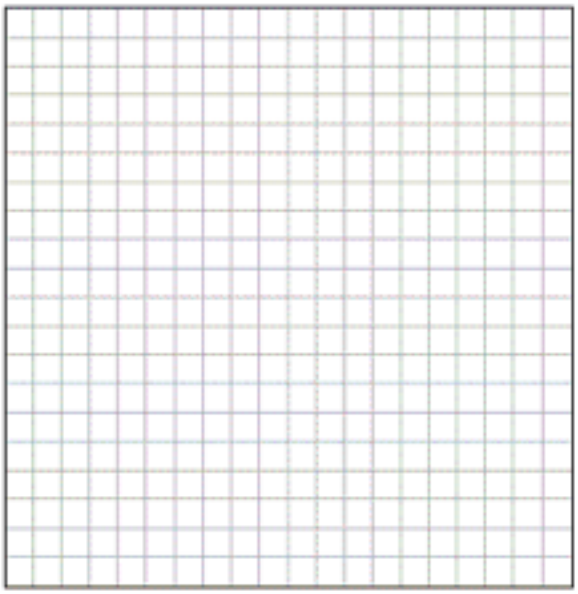


Regents Practice

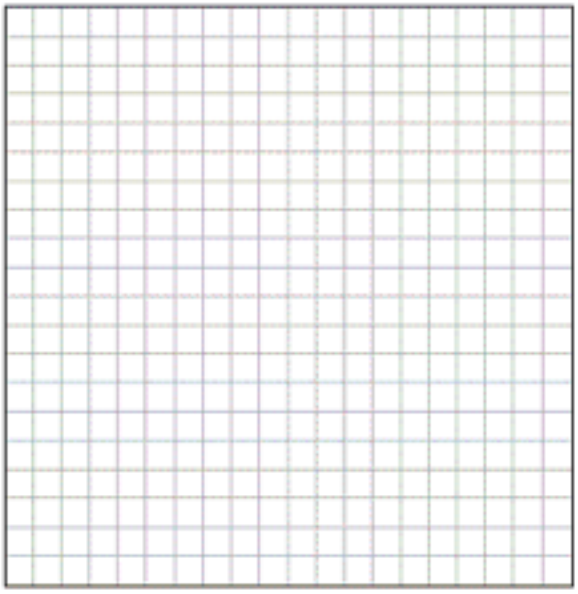
1) The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?

1) $m\angle A = m\angle B$
2) $m\angle A = m\angle C$
3) $m\angle ACB = 90$
4) $m\angle ABC = 60$

2) Triangle *ABC* has coordinates $A(-6,2)$, $B(-3,6)$, and $C(5,0)$. Find the perimeter of the triangle. Express your answer in simplest radical form. [The use of the grid below is optional.]



3) **Given**: Quadrilateral ABCD has vertices A(−5,6), B(6,6), C(8,−3), and D(−3,−3).
Prove: Quadrilateral ABCD is a parallelogram but is neither a rhombus nor a rectangle.



4) Quadrilateral MATH has coordinates M(1,1), A(−2,5), T (3,5), and H(6,1). Prove that quadrilateral MATH is a rhombus and prove that it is not a square.