**Math Reviewer**

**Quadrilaterals**

**Quadrilaterals:**

* **Quadrilaterals** – A **quadrilateral** is a polygon with **four sides (edges)**, **four vertices (corners)**, and **four interior angles**. The **sum of the interior angles** of any quadrilateral is always **360°**.
* **General Quadrilateral Rules:**
* 4 sides, 4 vertices, 4 interior angles
* Interior angle sum = 360°.
* Area can be found by splitting into triangles (e.g., shoelace method).
* **Diagonals**: connect opposite vertices, may or may not be equal or bisecting depending on type.

**Geometry Vocabulary:**

* **Bisect** – To divide into **two equal parts**.
* **Diagonal** – A line segment connecting **two non-adjacent vertices** of a polygon.
* **Parallel** – Two lines that are **always the same distance apart** and **never meet**.
* **Perpendicular** – Lines that meet at a **90° angle**.
* **Supplementary angles** – Two angles that **add up to 180°**.
* **Congruent** – Shapes or angles that are **exactly equal in size and measure**.
* **Symmetry** – When a shape can be divided into **matching parts** across a line (axis of symmetry).
* **Axis of symmetry** – The **line that divides a shape** into two mirror-image halves.
* **Adjacent sides** – Two sides that **share a common vertex**.
* **Opposite sides** – Sides that **do not share a vertex** and face each other.
* **Vertex (plural: vertices)** – The **corner point** where two sides meet.
* **Base (of trapezoid)** – One of the **parallel sides** of a trapezoid.
* **Legs (of trapezoid)** – The **non-parallel sides** of a trapezoid.
* **Equal sides** – Sides with the **same length**.
* **Equal angles** – Angles with the **same measure**.
* **Interior angle** – An **angle inside a polygon**, formed by two adjacent sides.
* **Exterior angle** – An **angle outside a polygon**, formed when one side is extended.
* **Area** – The **amount of space inside** a shape (measured in square units).
* **Circumcircle** – A circle that **passes through all vertices** of a polygon.

**Quadrilateral Anatomy:**

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| **Quadrilateral:**   * **Adjacent sides:** ZE & EP, EP & PH, PH & HZ, HZ & ZE * **Opposite sides:** ZE & PH, EP & HZ (not always equal or parallel) * **Adjacent angles:** ∠Z & ∠E, ∠E & ∠P, ∠P & ∠H, ∠H & ∠Z * **Opposite angles:** ∠Z & ∠P, ∠E & ∠H (no special equality in general) * **Diagonals:** ZP, EH (no fixed relation in general) * **Rule:** Interior angles sum = 360° |  |

**Rules in Quadrilateral:**

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| **Anatomy of Quadrilaterals** | |
| **Rectangle: Special Parallelogram**   * **Adjacent sides**: ZE & EP, EP & PH, PH & HZ, HZ & ZE * **Opposite sides**: ZE & PH, EP & HZ (equal & parallel) * **Adjacent angles**: ∠Z & ∠E, ∠E & ∠P, ∠P & ∠H, ∠H & ∠Z (all 90°) * **Opposite angles**: ∠Z & ∠P, ∠E & ∠H (both 90°) * **Diagonals**: ZP, EH (equal, bisect each other) | **Rhombus: Special Parallelogram**   * **Adjacent sides**: ZH & HE, HE & EP, EP & PZ, PZ & ZH (all equal) * **Opposite sides**: ZH & EP, HE & PZ (equal & parallel) * **Adjacent angles**: Share a vertex (not necessarily 90°) * **Opposite angles**: ∠Z & ∠P, ∠E & ∠H (equal) * **Diagonals**: ZP, HE (perpendicular, bisect each other & angles) |
| **Square: Special Parallelogram**   * **Adjacent sides**: ZE & EP, EP & PH, PH & HZ, HZ & ZE (all equal) * **Opposite sides**: ZE & PH, EP & HZ (equal & parallel) * **Adjacent angles**: ∠Z & ∠E, ∠E & ∠P, ∠P & ∠H, ∠H & ∠Z (all 90°) * **Opposite angles**: ∠Z & ∠P, ∠E & ∠H (both 90°) * **Diagonals**: ZP, EH (equal, perpendicular, bisect each other & angles) | **Isosceles Trapezoid: Other Quadrilaterals**   * **Adjacent sides**: ZE & EP, EP & PH, PH & HZ, HZ & ZE * **Opposite sides**: ZE & HP (parallel bases), ZH & EP (equal legs) * **Adjacent angles**: Base angle pairs (∠Z & ∠E, ∠H & ∠P) equal * **Opposite angles**: ∠Z & ∠P, ∠E & ∠H (not equal, but supplementary if cyclic) * **Diagonals**: ZP, EH (equal length) |
| **Kite: Other Quadrilaterals**   * **Adjacent sides**: ZH & HE, HP & PZ (two pairs equal) * **Opposite sides**: None necessarily equal or parallel * **Adjacent angles**: ∠Z & ∠E, ∠H & ∠P (in symmetric kite, some equal) * **Opposite angles**: ∠Z & ∠P (equal in symmetric kite) * **Diagonals**: ZP, HE (perpendicular; one bisects the other) |  |
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