Definition: A **trapezoid** is a quadrilateral with exactly **one pair** of its **sides parallel**.

✓ **Vocabulary:**
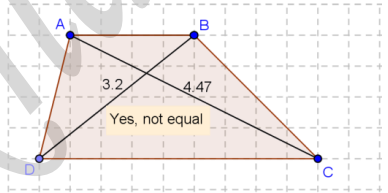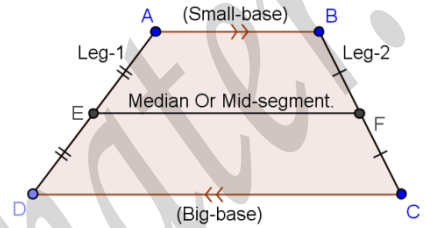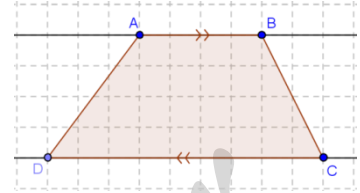
    ✤ **Bases of a trapezoid:** are the parallel sides.

    ✤ **Legs of a trapezoid:** are the non-parallel sides.

    ✤ **Median or mid-segment of a trapezoid:** is the segment joining the midpoints of the legs.
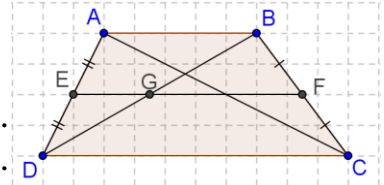
👀 *Note that:* In a trapezoid diagonals

    ➢ Are **not Equal**.

    ➢ Do **not** bisect each other **they only intersect each other.**

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Consider E & F to be the respective midpoints of the legs $[AD]$ & $[BC]$ of the trapezoid $ABCD$

1) Prove that: $EG = \dfrac{1}{2}AB$ and $GF = \dfrac{1}{2}DC$.

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2) Deduce the relation between $[EF]$ and the bases $[AB]$ & $[BC]$.

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3) Is the midsegment parallel to the bases of the trapezoid? Justify.

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Conclusion:

✓ The midsegment in a trapezoid state that:

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✓ The converse of midsegment in a trapezoid state that:

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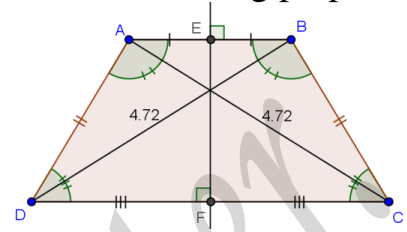
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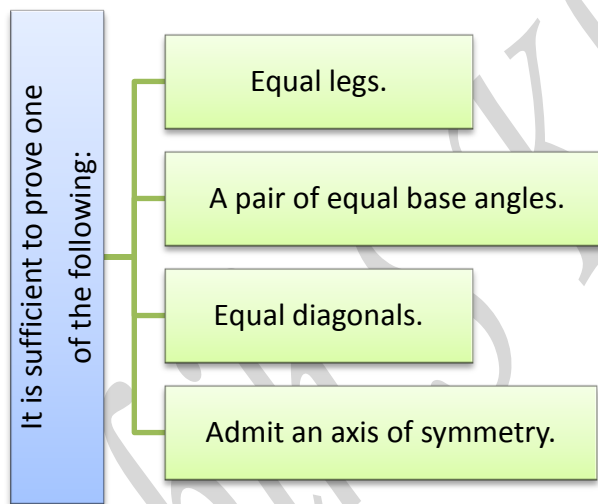
✓ *Types of a trapezoid:*

Isosceles trapezoid:

I'm a trapezoid, so I have a pair of parallel sides. In addition to the following properties:

- ➢ My legs are equal.
- ➢ My base angles are equal.
- ➢ My diagonals are equal.
- ➢ My opposite angles are supplementary.
- ➢ My bases share the same peerpendicular bisector.

How to prove a trapezoid Isosceles?

It is sufficient to prove one of the following:

- Equal legs.
- A pair of equal base angles.
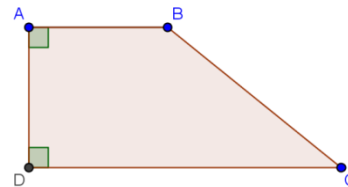- Equal diagonals.
- Admit an axis of symmetry.

Notice that, an isoscles trapezoid admits one axis of symmetry, the perpendicular bisector of the bases.

Right trapezoid:

I'm a trapezoid in which one of my legs is <u>perpendicular</u> to my bases.

Extra things to know about a trapezoid

$$Area\ is: A = \frac{h \times (b_1 + b_2)}{2}.$$

Perimeter is:
$$P = sum\ of\ all\ sides.$$
$$= (b_1 + b_2) + (l_1 + l_2).$$