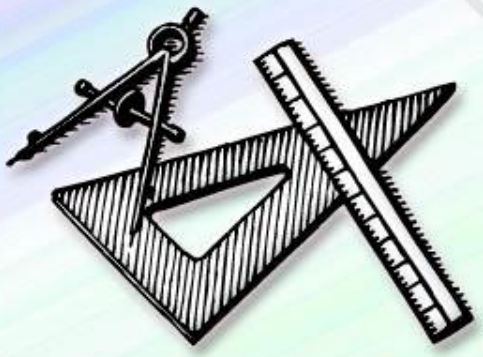
7.1 Triangle Application Theorems and 7.2 Two Proof-Oriented Theorems

Objective: To apply theorems about the interior angles, the exterior angles, and the midlines of triangles.

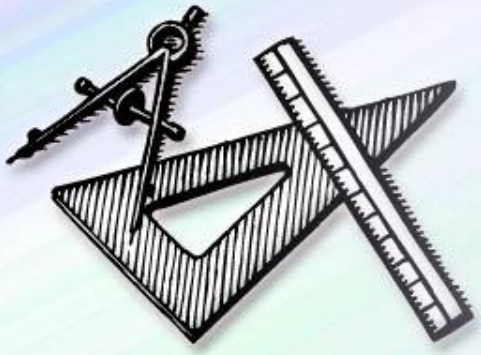


Index Card

Definition

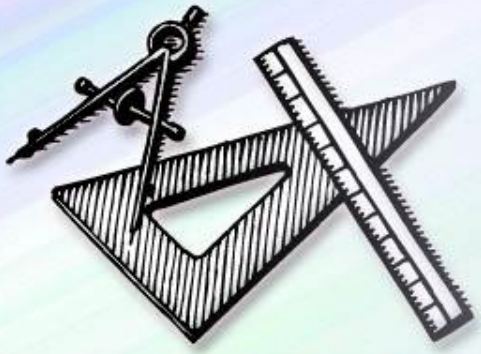
- Exterior angles (page 296)

Be sure to include a diagram!!!



Theorems – INDEX CARDS

- The sum of the measures of the three angles of a triangles is 180.
- The measure of an exterior angles of a triangles is equal to the sum of the measures of the remote interior angles.
- If a segment joining the midpoints of two sides of a triangle is parallel to the third side, then its length is one-half the length of the third side (Midline Theorem).
- If two angles of one triangle are congruent to two angles of a second triangle, then the third angles are congruent (No-Choice Theorem).



See pages 295, 296, and 302

Don't forget to draw diagrams for each!!!!!

Example 1

In the diagram as marked, if m∠G = 50, find m∠M.

Solution

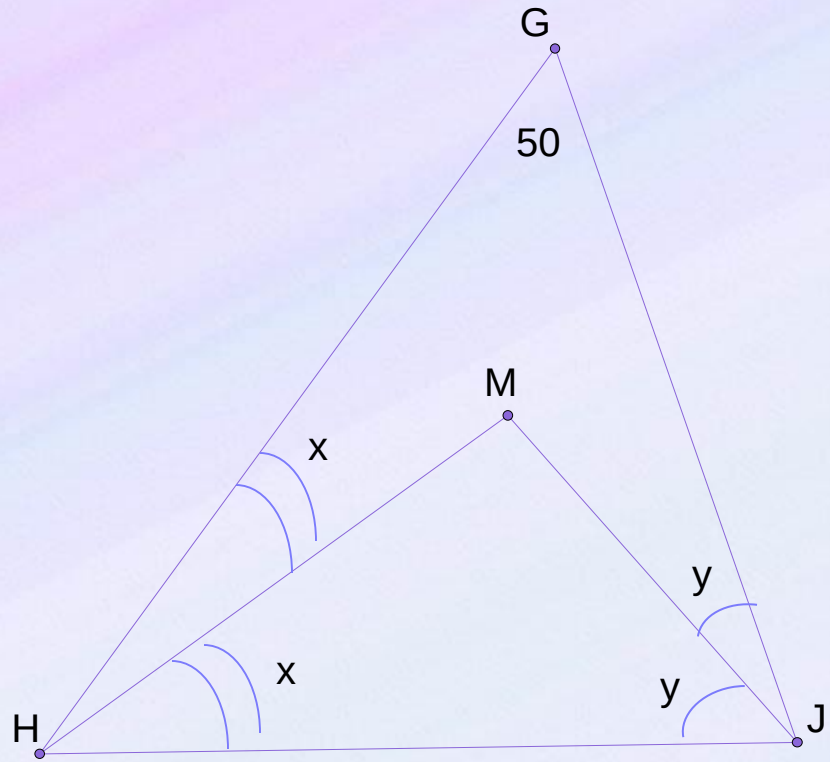
$2x + 2y + 50 = 180$

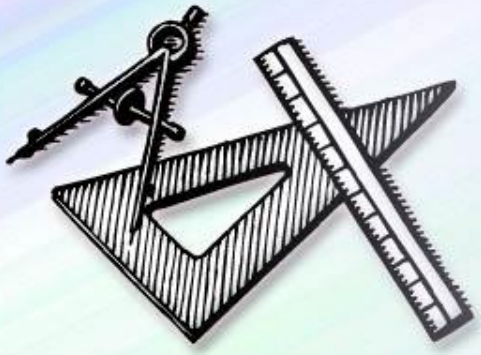
$2x + 2y = 130$

$x + y = 65$

$65 + m\angle M = 180$

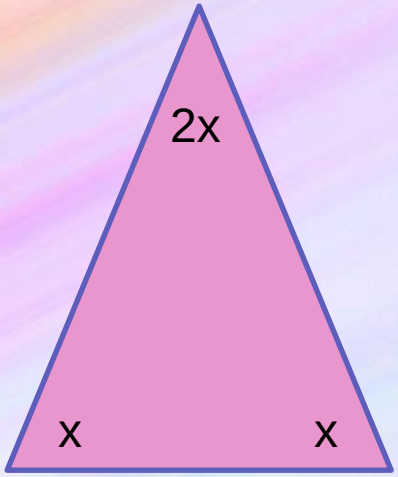
$m\angle M = 115$





Example 2

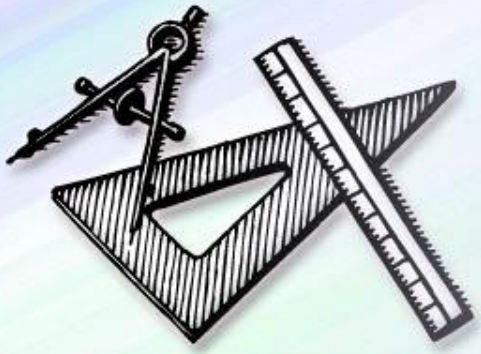
The vertex angle of an isosceles triangle is twice as large as one of the base angles. Find the measure of the vertex angle.



Let m vertex $\angle$ = 2x

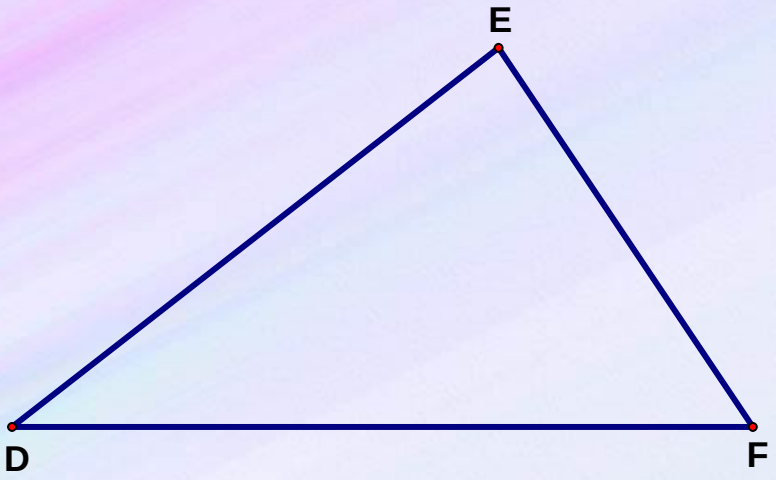
$$x + x + 2x = 180$$
$$4x = 180$$
$$x = 45$$

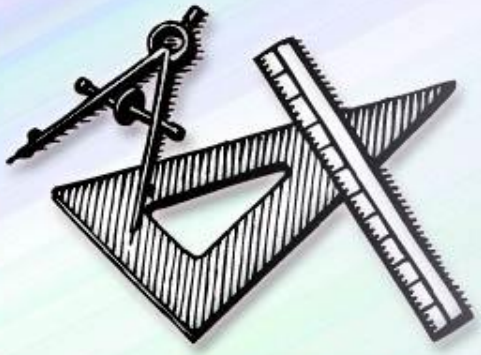
m vertex $\angle$ = 2(45) = 90



Example 3

In ΔDEF, the sum of the measures of $\angle D$ and $\angle E$ is 110. The sum of the measures of $\angle E$ and $\angle F$ is 150. Find the sum of the measures of $\angle D$ and $\angle F$.





Solution

$\angle D + \angle E + \angle F = 180$

$110 + \angle F = 180$

$\angle F = 70$

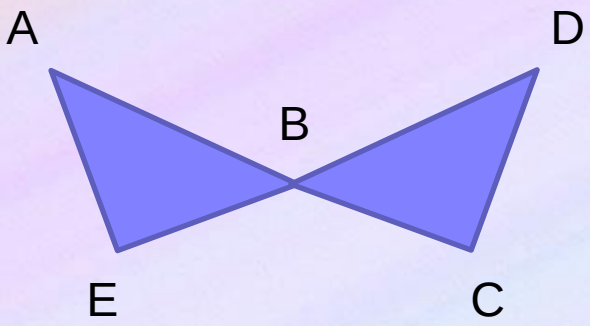
$\angle D + 150 = 180$

$\angle D = 30$

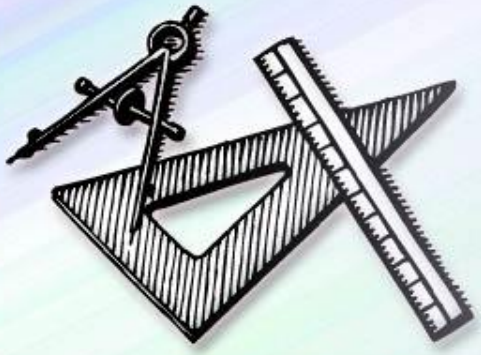
$\therefore \angle D + \angle F = 30 + 70 = 100$

Given: $\angle A = \angle D$

Prove: $\angle E = \angle C$



Statements	Reasons
1. $\angle A = \angle D$	1. Given
2. $\angle ABE = \angle DBC$	2. Vertical Angles Congruent
3. $\angle E = \angle C$	3. No-Choice Theorem



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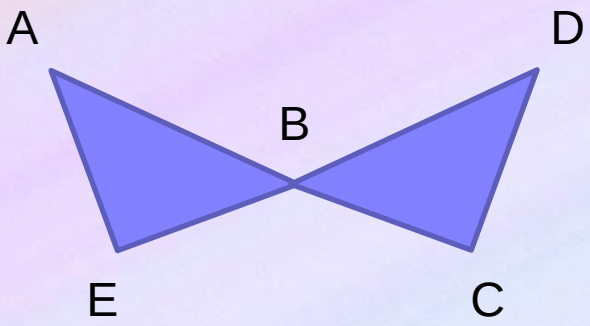

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