

AREA OF REGULAR POLYGONS

To be a **regular polygon**, a polygon must be equilateral & equiangular

Radius of a regular polygon: connects center to vertex

Apothem of a regular polygon: Connects center to midpoint

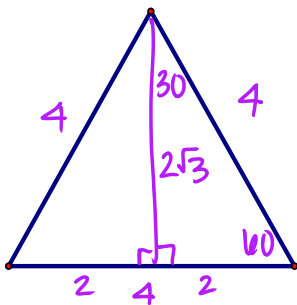
Area of an Equilateral Triangle

$$\frac{s^2\sqrt{3}}{4} \text{ or } \frac{1}{2}bh$$

For the following examples, find the exact area of each figure.

- 1) Find the area of an equilateral triangle with a side length of 4 cm.

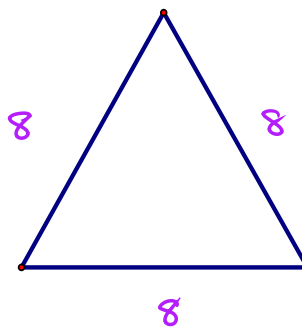
★ First show without formula ★



$$A = \frac{1}{2}(2\sqrt{3})(4)$$

$$\boxed{4\sqrt{3} \text{ cm}^2}$$

- 2) Find the area of an equilateral triangle with a side length of 8 cm.

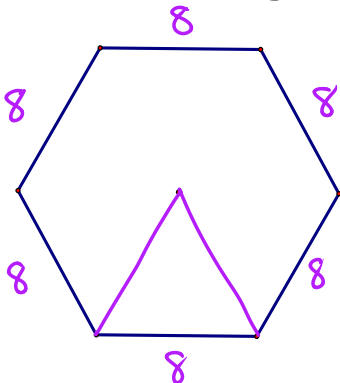


$$\frac{8^2\sqrt{3}}{4}$$

$$\frac{64\sqrt{3}}{4}$$

$$\boxed{16\sqrt{3} \text{ cm}^2}$$

- 3) Find the area of a regular hexagon with a side length of 8 cm.



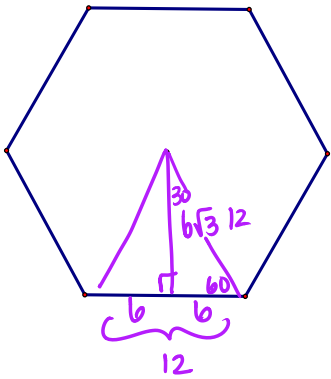
$$\frac{8^2\sqrt{3}}{4}$$

$$\frac{64\sqrt{3}}{4}$$

$$16\sqrt{3} \times 6$$

$$\boxed{96\sqrt{3} \text{ cm}^2}$$

4) Find the area of a regular hexagon with an apothem of $6\sqrt{3}$ cm.



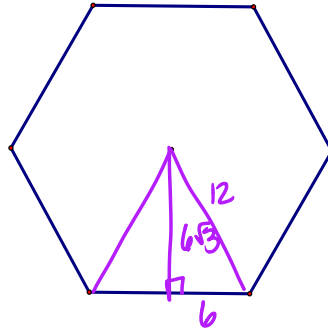
$$A = \frac{12^2\sqrt{3}}{4} \times 6$$

$$\frac{144\sqrt{3}}{4} \times 6$$

$$36\sqrt{3} \times 6$$

$$216\sqrt{3} \text{ cm}^2$$

5) Find the area of a regular hexagon with a radius of 12 in.



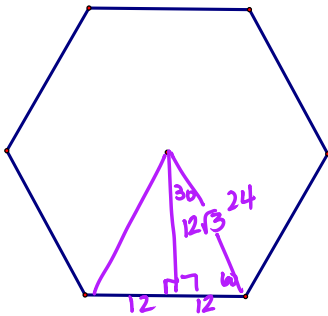
$$A = \frac{12^2\sqrt{3}}{4} \times 6$$

$$\frac{144\sqrt{3}}{4} \times 6$$

$$216\sqrt{3}$$

Try on your own!

6) Find the area of a regular hexagon with an apothem of $12\sqrt{3}$ ft.



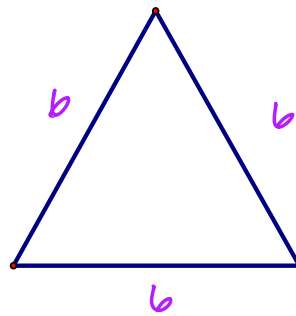
$$A = \frac{24^2\sqrt{3}}{4} \times 6$$

$$\frac{576\sqrt{3}}{4} \times 6$$

$$144\sqrt{3} \times 6$$

$$\boxed{864\sqrt{3} \text{ ft}^2}$$

7) Find the area of an equilateral triangle with a side length of 6 cm



$$A = \frac{6^2\sqrt{3}}{4}$$

$$\frac{36\sqrt{3}}{4}$$

$$\boxed{9\sqrt{3} \text{ cm}^2}$$