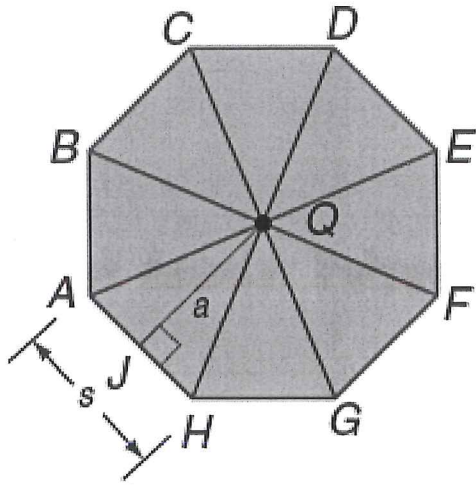


Name: Key

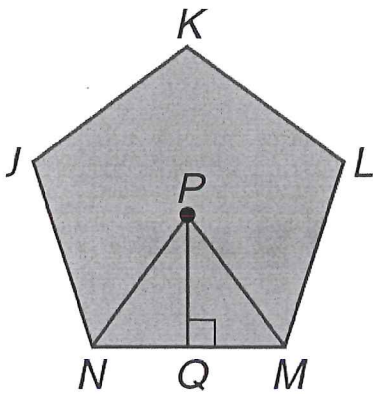
Area of Regular Polygons - Given a Side Length NOTES



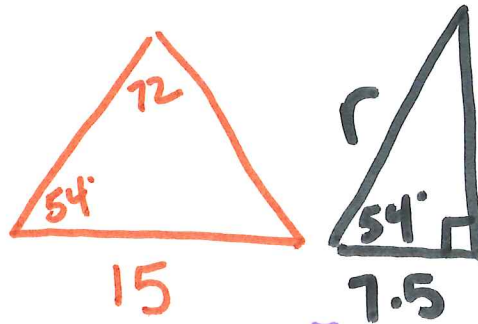
Side length is shown by 's' and it is on the side of the polygon

Example 1:

1. If $NM = 15\text{in}$



Step 1: Find Radius



$$\cos(54) = \frac{7.5}{r}$$
$$r \cos(54) = 7.5$$
$$\boxed{r = 12.8\text{in}}$$

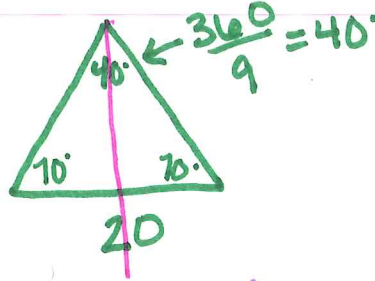
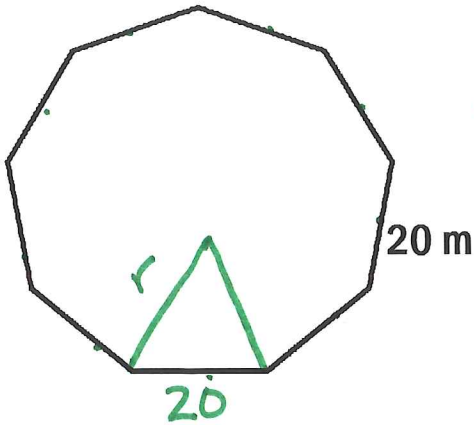
Take half of 15!!

Step 2: Find Area: $A = n \left(\frac{1}{2} a \cdot b \cdot \sin\theta \right)$

$$A = n \frac{1}{2} ab \sin\theta$$
$$A = 5 \frac{1}{2} 12.8 \times 12.8 \sin(72)$$
$$\boxed{A \approx 389.6\text{in}^2}$$

Directions: Find the area of the regular polygon. Show all work. Round to the nearest tenth.

1.



$$\cos(70) = \frac{10}{r}$$

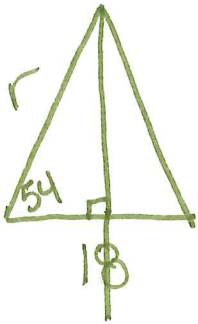
$$r = 29.2 \text{ m}$$

$$A = n \frac{1}{2} a \cdot b \sin \theta$$

$$A = 9 \frac{1}{2} 29.2 \times 29.2 \sin(40)$$

$$A \approx 2466.3 \text{ m}^2$$

2. Find the area of a regular pentagon with **perimeter** of 90cm.



$$\cos(54) = \frac{9}{r}$$

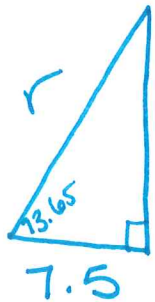
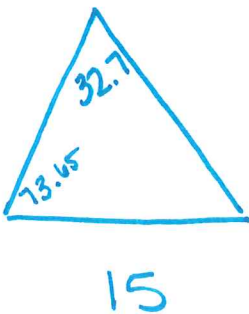
$$r = 15.3 \text{ cm}$$

$$A = 5 \frac{1}{2} 15.3 \times 15.3 \sin(72)$$

$$A \approx 556.6 \text{ cm}^2$$

3. Find the area of a regular undecagon with a perimeter of 165 cm

$$n = 11$$



$$\cos(73.67) = \frac{7.5}{r}$$

$$r = 26.6 \text{ cm}$$

$$A = 11 \frac{1}{2} \cdot 26.6 \times 26.6 \sin(32.7)$$

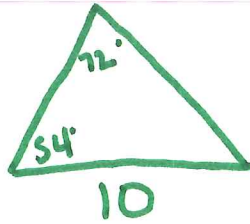
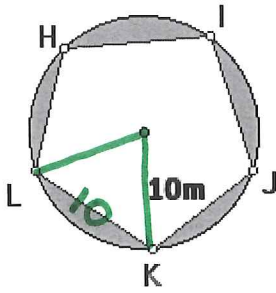
$$A = 2118.2 \text{ cm}^2$$

$$A = 2102.4 \text{ cm}^2$$

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Directions: Find the area of the shaded region. Show all work.

4.



$$\cos(54) = \frac{5}{R}$$

$$R = 8.5m$$

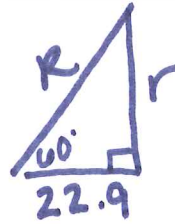
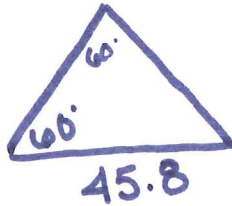
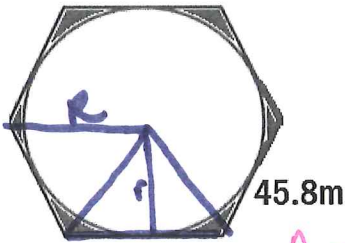
$$A = \pi r^2 - n \frac{1}{2} ab \sin \theta$$

$$A = \pi (8.5)^2 - 5 \frac{1}{2} 8.5 \times 8.5 \sin(72)$$

$$A \approx 55.2m^2$$

5.

on look an eg. Δ



$$\tan(60) = \frac{r}{22.9}$$

$$22.9 \tan(60) = r$$

$$39.7m = r$$

$$\cos(60) = \frac{22.9}{R}$$

$$R = 45.8m$$

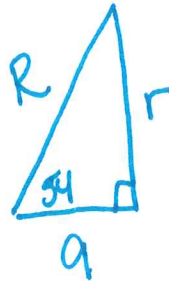
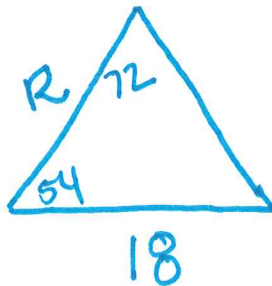
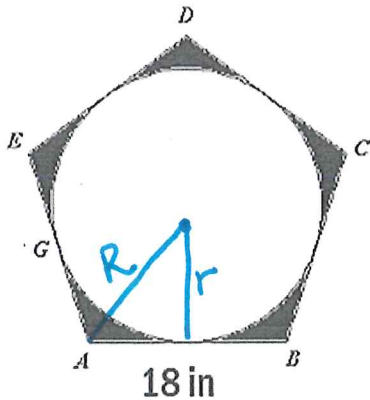
$$A = n \frac{1}{2} ab \sin \theta - \pi r^2$$

$$A = 6 \frac{1}{2} 45.8 \times 45.8 \sin(60) - \pi 39.7^2$$

$$A = 498.4m^2$$

$$498.4m^2$$

6.



$$\tan(54) = \frac{r}{9}$$

$$r \approx 12.4in$$

$$\cos(54) = \frac{9}{R}$$

$$R = 15.3in$$

$$A = n \frac{1}{2} ab \sin \theta - \pi r^2$$

$$A = 5 \frac{1}{2} (15.3)(15.3) \sin(72) - \pi (12.4)^2$$

$$A \approx 73.5in^2$$