

## Ch 11 Worksheet

### Solutions

1) Regular Octagon

$$\cos 22.5 = \frac{a}{10}$$

$$a \approx 9.23879 \text{ cm}$$

$$\sin 22.5 = \frac{\sigma}{10}$$

$$\sigma \approx 3.8268$$

$$x \quad 2$$

$$s \approx 7.65367 \text{ cm}$$

$$P = 8s$$

$$P \approx 8(7.65367)$$

$$P \approx 61.22934 \text{ cm}$$

$$A = \frac{1}{2}Pa$$

$$A = \frac{1}{2}(61.229)(9.23879)$$

$$A \approx 282.8425 \text{ cm}^2$$

Circle

$$A = \pi r^2$$

$$A = \pi(10)^2$$

$$A = 100\pi \text{ cm}^2$$

Area of Shaded Region  
Circle - Reg. Octagon

$$A = 100\pi - 282.8425$$

$$A \approx 31.3168 \text{ cm}^2$$

$$P = \frac{\text{Shaded}}{\text{circle}} = \frac{31.3168}{100\pi}$$

$$P \approx 0.09968$$

$$P \approx 10\%$$

2) Regular Octagon

$$\tan 22.5 = \frac{\sigma}{10}$$

$$\sigma \approx 4.142136$$

$$x \quad 2$$

$$s \approx 8.28427 \text{ cm}$$

$$P = 8s$$

$$P = 8(8.28427)$$

$$P \approx 66.27417 \text{ cm}$$

$$A = \frac{1}{2}Pa$$

$$A = \frac{1}{2}(66.27417)(10)$$

$$A \approx 331.37085 \text{ cm}^2$$

Circle

Need radius

$$\cos 22.5 = \frac{10}{r}$$

$$r \approx 10.823922 \text{ cm}$$

$$A = \pi r^2$$

$$A = \pi(10.8239)^2$$

$$A = 117.157288\pi \text{ cm}^2$$

Area of Shaded Region

$$A = 117.157\pi - 331.37085$$

$$A \approx 36.6896238 \text{ cm}^2$$

$$P = \frac{36.6896238}{117.157288\pi} \approx 0.996$$

$$P \approx 10\%$$

3.) Area of Polygon

$$a = \sqrt{3} \text{ cm}$$

$$s = 2 \text{ cm}$$

$$P = 6s$$

$$P = 6(2)$$

$$P = 12 \text{ cm}$$

$$A = \frac{1}{2} Pa$$

$$A = \frac{1}{2} (12)(\sqrt{3})$$

$$A = 6\sqrt{3} \text{ cm}^2$$

Area of Circle

$$A = \pi r^2$$

$$A = \pi (2)^2$$

$$A = 4\pi \text{ cm}^2$$

Area of Shaded Region

$$A = 4\pi - 6\sqrt{3}$$

$$A = 2.174066 \text{ cm}^2$$

$$p = \frac{2.174066}{4\pi} = 0.1730067$$

$$p \approx 17\%$$

4.) Area of Regular Polygon

$$a = 5\sqrt{3} \text{ cm}$$

$$P = 6s$$

$$P = 6(10)$$

$$P = 60 \text{ cm}$$

$$A = \frac{1}{2} Pa$$

$$A = \frac{1}{2} (60)(5\sqrt{3})$$

$$A = 30(5\sqrt{3})$$

$$A = 150\sqrt{3} \text{ cm}^2$$

Area of Circle

$$A = \pi r^2$$

$$A = 100\pi \text{ cm}^2$$

Area of Shaded Region

$$100\pi - 150\sqrt{3}$$

$$A = 54.3516 \text{ cm}^2$$

$$p = \frac{54.3516}{100\pi} = 0.1730067$$

$$p \approx 17\%$$

## Ch 11 Worksheet

5. Area of Octagon

$$\cos 22.5 = \frac{a}{8}$$

$$a \approx 7.391036 \text{ cm}$$

$$\sin 22.5 = \frac{b}{8}$$

$$b \approx 3.061467$$

$$x \quad \quad \quad 2$$

$$\Delta \approx 6.1229349 \text{ cm}$$

$$P = 8\Delta$$

$$P = 8(6.1229349)$$

$$P \approx 48.983479 \text{ cm}$$

$$A = \frac{1}{2}Pa$$

$$A = \frac{1}{2}(48.983479)(7.391036)$$

$$A \approx 181.0193296 \text{ cm}^2$$

Area of Triangle

$$h = a \approx 7.391036 \text{ cm}$$

$$b = \Delta \approx 6.1229349 \text{ cm}$$

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(6.1229349)(7.391036)$$

$$A \approx 22.6274162 \text{ cm}^2$$

Area of Shaded Region

$$A = 181.01933 - 22.6274$$

$$A \approx 158.3919 \text{ cm}^2$$

$$P = \frac{158.3919}{181.0193296} = 0.875$$

$$P = 87.5\%$$

6.) Area of Octagon

$$\tan 22.5 = \frac{b}{8}$$

$$b \approx 3.313708499$$

$$x \quad \quad \quad 2$$

$$\Delta \approx 6.627416998 \text{ cm}$$

$$P = 8\Delta$$

$$P = 8(6.627416998)$$

$$P = 53.01933598 \text{ cm}$$

$$A = \frac{1}{2}Pa$$

$$A = \frac{1}{2}(53.01933598)(8)$$

$$A \approx 212.0773439 \text{ cm}^2$$

Area of Triangle

$$h = a = 8 \text{ cm}$$

$$b = \Delta \approx 6.627417 \text{ cm}$$

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(6.627417)(8)$$

$$A \approx 26.509668 \text{ cm}^2$$

Area of Shaded Region

$$A = 212.07734 - 26.50967$$

$$A \approx 185.5676759 \text{ cm}^2$$

$$P = \frac{185.5676759}{212.0773439} = 0.875 \approx 87.5\%$$