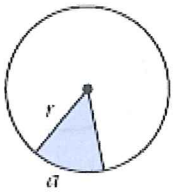
Name: _____ Date: _____

Geometric Probability Day #2- notes

Geometric Probability The probability that a point in a figure will lie in a particular part of the figure can be calculated by dividing the area of the part of the figure by the area of the entire figure. The quotient is called the **geometric probability** for the part of the figure.

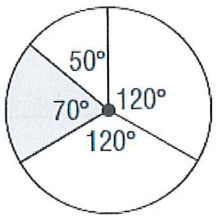
> If a point in region A is chosen at random, then the probability $P(B)$ that the point is in region B, which is in the interior of region A, is
> $P(B) = \frac{\text{area of region } B}{\text{area of region } A}$.

Find the area of both regions and then find the probability that a point chosen at random lies in the shaded region. Round your answers to the nearest tenth.



Examples:

1.



Shaded: $\frac{70}{360} \cdot \pi(5)^2 = 15.3\text{cm}^2$

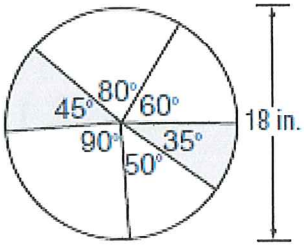
Total: $\pi(5)^2 = 25\pi = 78.5\text{ cm}^2$

$\frac{a}{360} \cdot \pi r^2 = A_{\text{sector}}$

Probability: $\frac{15.3}{78.5} = .1949$

$= \boxed{19.5\%}$

2.



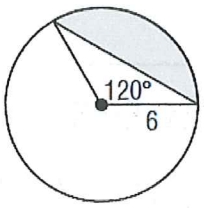
Shaded: $\frac{80}{360} \cdot \pi(9)^2 = 56.5\text{in}^2$

Total: $\pi(9)^2 = 81\pi = 254.5\text{ in}^2$

Probability: $\frac{56.5}{254.5} = .222$

$= \boxed{22.2\%}$

3.



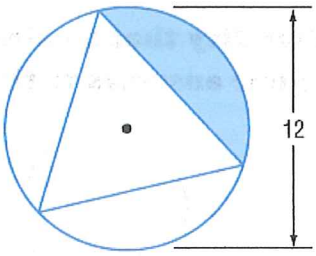
Shaded: $\frac{120}{360} \cdot 6^2\pi - \frac{1}{2}(6)(6)\sin 120$

$A: 37.7 - 15.6 = 22.1 \text{ units}^2$

Total $= \pi 6^2 = 36\pi = 113.1 \text{ units}^2$

Probability: $\frac{22.1}{113.1} = .195 \approx \boxed{19.5\%}$

4.



Shade $= \frac{1}{3}(\odot - \triangle)$

$A = \frac{1}{3}(\pi 6^2 - 3(\frac{1}{2})6 \cdot 6 \sin 120)$

$A \approx \frac{1}{3}(113.1 - 46.8)$

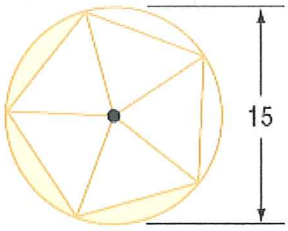
$A \approx \frac{1}{3}(66.3) \approx 22.1 \text{ units}^2$

Total: $\pi(6)^2 = 113.1 \text{ units}^2$

Probability: $\frac{22.1}{113.1} = .195$

$= \boxed{19.5\%}$

5.



Shaded: $\frac{3}{5}$ (⊙ − pentagon)

$A = \frac{3}{5}(\pi 7.5^2 - 5(\frac{1}{2})(7.5)^2 \sin 72)$

$A = \frac{3}{5}(56.25\pi - 133.7) = \frac{3}{5}(43.0)$

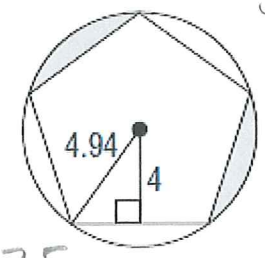
$A = 25.8 \text{ units}^2$

Total $= 56.25\pi = 176.7 \text{ units}^2$

Probability: $\frac{25.8}{176.7} = .146$

$= \boxed{14.6\%}$

6.



Shaded: $\frac{2}{5}$ (⊙ − pentagon)

$A = \frac{2}{5}(\pi 4.94^2 - 5(\frac{1}{2})(4.94)^2 \sin 72)$

$A = \frac{2}{5}(24.4\pi - 58.0)$

$A = \frac{2}{5}(18.7) = 7.5 \text{ units}^2$

Total: $\pi(4.94)^2 = 15.5 \text{ units}^2$

Probability: $\frac{7.5}{15.5}$

$= .484$

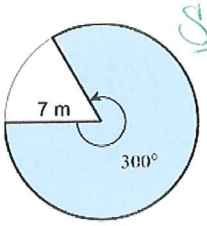
$\boxed{48.4\%}$

Name: _____ Date: _____

GEOMETRIC PROBABILITY DAY #2- HW

Find the area of both regions and then find the probability that a point chosen at random lies in the shaded region. Round your answers to the nearest tenth.

1.



Shaded: $\frac{300}{360} \cdot \pi(7)^2$

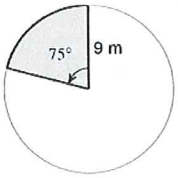
$= 128.3\ m^2$

Total $= 49\pi = 153.9\ m^2$

Prob. $= \frac{128.3}{153.9} = .833$

83.3%

2.



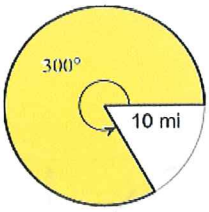
Shaded: $\frac{75}{360} \cdot 9^2\pi = 53.01$

Total: $81\pi = 254.5\ m^2$

Prob.: $\frac{53.0}{254.5} = .208$

20.8%

3.



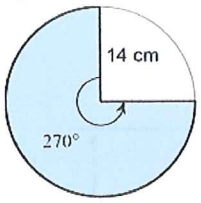
Shaded: $\frac{300}{360} \cdot \pi 10^2 = 261.8\ mi^2$

Total: $100\pi = 314.2\ mi^2$

Prob.: $\frac{261.8}{314.2} = .833$

83.3%

4.



Shaded: $\frac{270}{360} \cdot \pi 14^2$

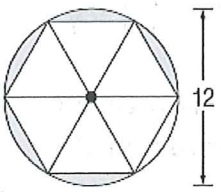
$= 461.8\ cm^2$

Total: $196\pi = 615.8$

Prob: $\frac{461.8}{615.8} = .749$

75%

5.



$r = 6$

Shaded : $\frac{5}{6}$(O - hexagon)

$= \frac{5}{6}(\pi 6^2 - 6(\frac{1}{2})(6)^2 \sin 60)$

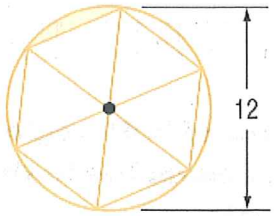
$= \frac{5}{6}(19.57) = 16.3 \text{ units}^2$

Total : $36\pi = 113.1 \text{ units}^2$

Prob : $\frac{16.3}{113.1} = .144$

$= \boxed{14.4\%}$

6.



$r = 6$

Shaded : $\frac{1}{6}$(O - hexagon)

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

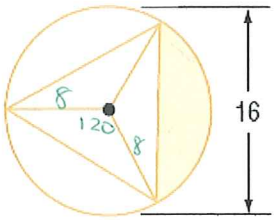
$= \frac{1}{6}(19.57) = 3.26 \text{ units}^2$

Total : $36\pi = 113.1 \text{ units}^2$

Prob : $\frac{3.26}{113.1} = .0288$

$= \boxed{2.9\%}$

7.



$r = 8$

Shaded : $\frac{1}{3}$(O - Δ)

$= \frac{1}{3}(\pi 8^2 - 3(\frac{1}{2})(8)^2 \sin 120)$

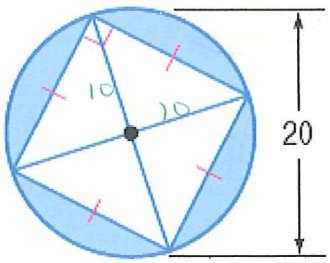
$= \frac{1}{3}(117.92) = 39.3 \text{ units}^2$

Total : $64\pi = 201.1 \text{ units}^2$

Prob : $\frac{39.3}{201.1} = .195$

$= \boxed{19.5\%}$

8.



$r = 10$

Shaded : O - □

$= \pi 10^2 - 4(\frac{1}{2})(10)^2 \sin 90$

$= 114.2 \text{ units}^2$

Total : $100\pi = 314.2 \text{ units}^2$

Prob : $\frac{114.2}{314.2} = .364$

$= \boxed{36.4\%}$