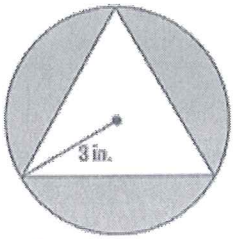
Name: _____ Date: _____

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 probability that a point chosen at random lies in the shaded region. Round your answers to the nearest tenth.

1.



What are we given? radius

How do we find area? $A = n(\frac{1}{2}ab\sin\theta)$

$A = \bigcirc - \triangle$

Area of SHADED= $= \pi(3)^2 - 3(\frac{1}{2}\cdot 3\cdot 3\cdot \sin 120)$

$= 9\pi - 11.7$

$= 16.6\ in^2$

Area of TOTAL= 9π ↑ outside shape

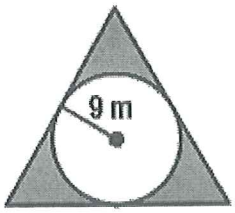
$\frac{Area\ of\ shaded}{Area\ of\ Total} = \frac{16.6}{(9\pi)}$

$\approx 58.7\%$

$\neq .6$

$\theta = \frac{360}{3} = 120$

2.



What are we given? radius of circle + apothem of $\triangle$ (↓ plug it in; ↓ use cosine)

How do we find area?

$A = \triangle - \bigcirc$

Area of SHADED= $r = 18$ $r = 9$

$A = 3(\frac{1}{2}\cdot 18\cdot 18\sin 120) - \pi 9^2$

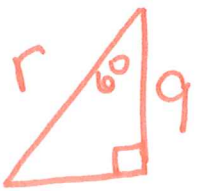
$= 420.9 - 81\pi$

$= 166.4\ m^2$

Area of TOTAL= $420.9\ m^2$

$\frac{Area\ of\ shaded}{Area\ of\ Total} = \frac{166.4}{420.9}$

$\approx 39.5\%$



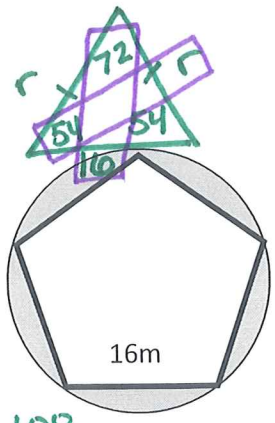
$\cos 60 = \frac{9}{r}$

$r = 18$

$\theta = \frac{360}{3} = 120$

$\frac{1}{2}\theta = 60$

3.



What are we given? side length

How do we find area? use Law of Sines

$\theta = \frac{360}{5}$

$\theta = 72$

$180 - 72 = \frac{108}{2} = 54$

$\frac{\sin 72}{16} = \frac{\sin 54}{r}$

$r \sin 72 = 16 \sin 54$

$r = 13.6\ m$

Area of SHADED= $A = O - pentagon$

$= \pi(13.6)^2 - 5\left(\frac{1}{2}(13.6)^2 \sin 72\right)$

$= 185\pi - 439.8$

$= 141.4\ m^2$

Area of TOTAL=

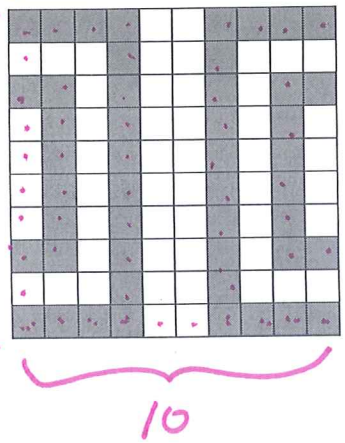
↓

circle: 185π

$\frac{Area\ of\ shaded}{Area\ of\ Total} = \frac{141.4}{185\pi}$

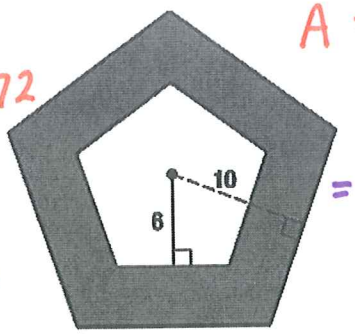
$\approx 24.3\%$

4.



$\frac{Area\ of\ shaded}{Area\ of\ Total} = \frac{48}{100} = 48\%$

5.



$A = Big - Little$

$r = 12.4 \quad r = 7.4$

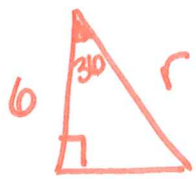
$= 5\left(\frac{1}{2}(12.4)^2 \sin 72\right) - 5\left(\frac{1}{2}(7.4)^2 \sin 72\right)$

$= 365.6 - 130.2$

$= 235.4\ units^2$

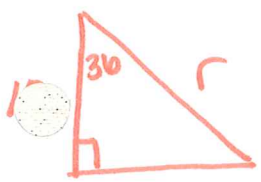
$\frac{Area\ of\ shaded}{Area\ of\ Total} = \frac{235.4}{365.6}$

$\approx 64.4\%$



$r \cdot \cos 36 = \frac{6}{r}$

$r = 7.4$



$\cos 36 = \frac{10}{r}$

$r = 12.4$