Geometry 13.3

Find probabilities by using length

Find probabilities by using area*

*It is assumed that you know how to find the area of circles, triangles, etc.
(Middle school standard)

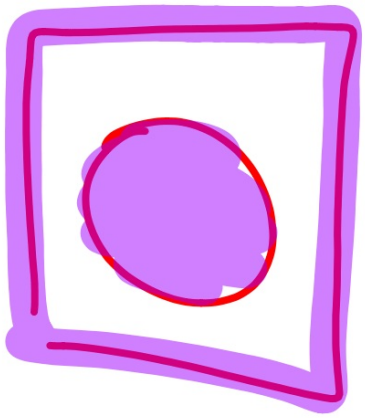
probability – how likely

geometric probability

$$\frac{\text{area of target}}{\text{total area}}$$

Quiz 13.1-13.2
Thurs.

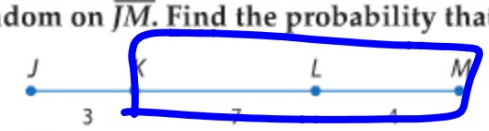
$$\frac{\text{Area of "target"}}{\text{Total area}}$$



target/total (often helpful if change to %)

Example 1 Use Lengths to Find Geometric Probability

Point X is chosen at random on $\overline{JM}$. Find the probability that X is on $\overline{KL}$.



$\frac{7}{14} = \frac{1}{2}$

50%

14

Guided Practice

Point X is chosen at random on $\overline{JM}$. Find the probability of each event.

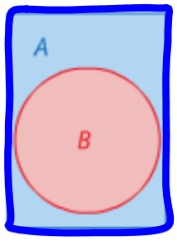
1A. $P(X \text{ is on } \overline{LM})$ $\frac{4}{14} = \frac{2}{7}$

1B. $P(X \text{ is on } \overline{KM})$ $\frac{11}{14}$

KeyConcept Area Probability Ratio

Words If a region A contains a region B and a point E in region A is chosen at random, then the probability that point E is in region B is $\frac{\text{area of region } B}{\text{area of region } A}$.

Circle / rect.



What percentage (of the whole thing) is shaded?
target/total

Reminder: 360 degrees in a circle!

Example 4 Use Angle Measures to Find Geometric Probability

Use the spinner to find each probability.

a. *P*(pointer landing on yellow)

$\frac{45}{360} = 0.125$

12.5%

c. *P*(pointer landing on neither red nor blue)

$\frac{135}{360}$ 0.375 37.5%

4A. P(pointer landing on blue)

$\frac{70}{360}$ 0.194 19.4%

4B. P(pointer not landing on green)

$\frac{270}{360} = 0.75$ 75%

3.14 / 28.26 ≈ 11%

Real-World Example 3 Use Area to Find Geometric Probability

SKYDIVING Suppose a skydiver must land on a target of three concentric circles. If the diameter of the center circle is 2 yards and the circles are spaced 1 yard apart, what is the probability that the skydiver will land in the red circle?

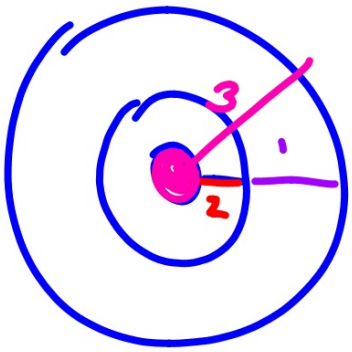
3.14 · 1² = 3.14 small r=1

12.56 med r=2

28.26 lg r=3

small

large

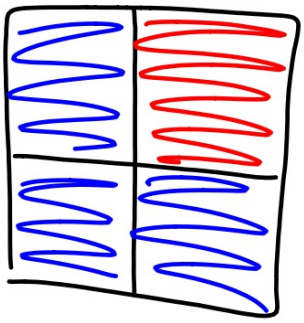


A. *P*(skydiver lands in the blue region) 55.5%

B. *P*(skydiver lands in white region) 9.42 / 28.26 33.3%

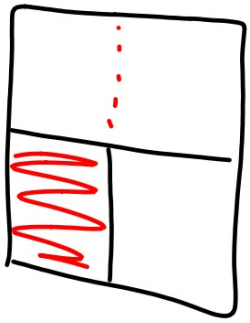
lrg-med / total 15.7 / 28.26

Complement



$P_{red} = \frac{1}{4}$

$100\% - 25 = 75\%$



$\frac{1}{4}$ 25%

p. 934

7-250

2 9-31

51-53