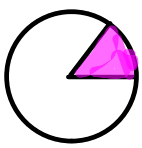
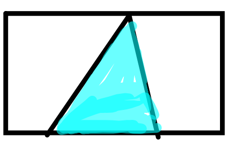
10-6 Geometric Probability

What are the chances that I will roll a 3? ________

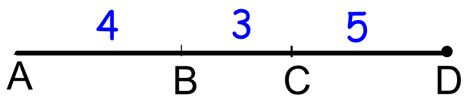
When working with probability, the set of all possible outcomes of an experiment is called the _______ _______. Any set of outcomes is called the event.

In geometric probability, the probability of an event is based on a ratio of geometric measures such as _______ and _________.

Geometric Probability

Example	Sample Space	Event	Probability
	All points on $\overline{AD}$	All points on $\overline{BC}$	P =
	All points in the circle	All points in the shaded region	P =
	All points in the rectangle	All points in the triangle	P =

Ex 1: A point is chosen randomly on AD, find the probability of each event.

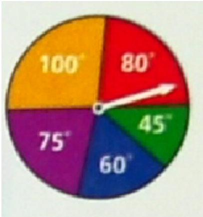


a. $P = \frac{AC}{AD}$

b. A point not on $\overline{AB}$

c. The point is on $\overline{AB}$ or $\overline{CD}$

Ex 2: Use the spinner to find the probability of each:

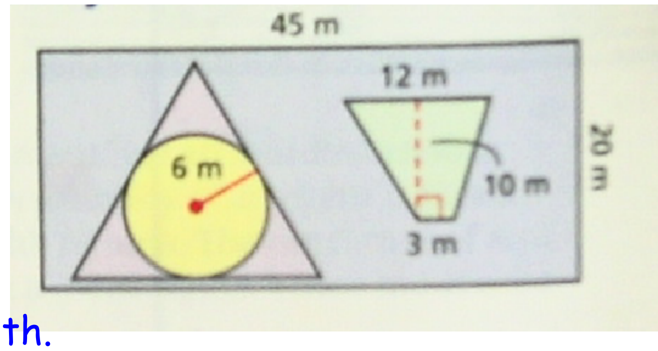


a. pointer landing on red

b. pointer landing on purple or blue

c. pointer NOT landing on yeallow

Ex 4: Find the probability of a point chosen randomly inside the rectangle is in each given shape.



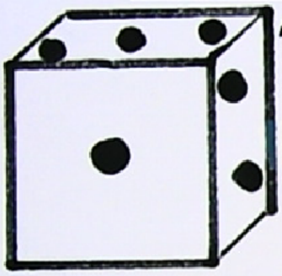
Round to nearest hundredth.

a. the equilateral triangle

b. the trapezoid

c. the circle

10-6 Geometric Probability



six faces on a die, one face contains a 3

What are the chances that I will roll a 3? 1/6 or 16%

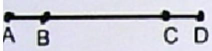
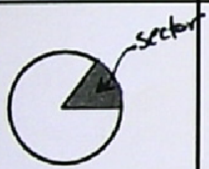
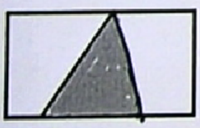
$\frac{1}{6}$ ← possible outcome / ← total sample space

When working with probability, the set of all possible outcomes of an experiment is called the sample space. Any set of outcomes is called the event.

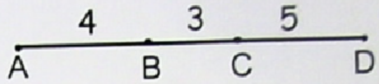
In geometric probability, the probability of an event is based on a ratio of geometric measures such as length and area. (the must be measurable)

Geometric Probability

$P = \frac{\text{event}}{\text{sample space}}$

Example	Sample Space	Event	Probability
	All points on $\overline{AD}$	All points on $\overline{BC}$	$P = \frac{BC}{AD}$
	All points in the circle	All points in the shaded region	$P = \frac{\text{area of sector}}{\text{area of circle}}$ or $\frac{\text{measure of central angle}}{360°}$
	All points in the rectangle	All points in the triangle	$P = \frac{\text{area of triangle}}{\text{area of rectangle}}$

Ex 1: A point is chosen randomly on AD, find the probability of each event.



a. $P = \frac{AC}{AD} = \frac{4+3}{4+3+5} = \boxed{\frac{7}{12}}$

b. A point not on $\overline{AB}$ $= \frac{BD}{AD} = \frac{3+5}{12} = \frac{8}{12} = \boxed{\frac{2}{3}}$

c. The point is on $\overline{AB}$ or $\overline{CD}$ $= \frac{AB}{AD} + \frac{CD}{AD} = \frac{4}{12} + \frac{5}{12} = \frac{9}{12} = \boxed{\frac{3}{4}}$

Ex 2: Use the spinner to find the probability of each:

a. pointer landing on red $\frac{80°}{360°} = \boxed{\frac{2}{9}}$

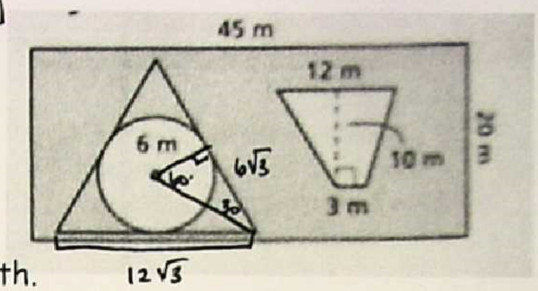
b. pointer landing on purple or blue
$\frac{75}{360} + \frac{60}{360} = \frac{135}{360} = \boxed{\frac{3}{8}}$

c. pointer NOT landing on yeallow
(oops (Ha Ha!) Yellow

$\frac{360-100}{360} = \frac{260}{360} = \boxed{\frac{13}{18}}$

Ex 4: Find the probability of a point chosen randomly inside the rectangle is in each given shape.

Round to nearest hundredth.



do 1st

a. the equilateral triangle

$\frac{108\sqrt{3}}{900} = \frac{12\sqrt{3}}{100} = \frac{3\sqrt{3}}{25} \approx \boxed{.21}$

b. the trapezoid

$\frac{75}{900} \approx \boxed{.08}$

c. the circle

$\frac{36\pi}{900} \approx \boxed{.13}$

Find the area of each:

rectangle $= 45(20) = 900\,m^2$

trapezoid $= \frac{10(12+3)}{2} = 75\,m^2$

equilateral Δ $= \frac{s^2\sqrt{3}}{4} = \frac{(12\sqrt{3})^2\sqrt{3}}{4}$

$= \frac{144 \cdot 3\sqrt{3}}{4} = 108\sqrt{3}\,m^2$

circle $= \pi(6)^2 = 36\pi\,m^2$