Warm-Up | Describing Data

Lesson Question

Lesson Goals

Explore data collection and data displays.

Differentiate between a _____ and a sample.

Classify a sample as _____ or biased.

Identify the different ways to collect data.

Interpret a data display in terms of the shape of the data _____

Warm-Up | Describing Data

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

	a part of a group that is examined to provide information or make predictions about the population
	a sample in which each element in a population has an equal chance of being selected
	observed, categorical data describing the qualities or characteristics of a group
	a sample in which the method used to form the sample results in samples that are not representative of the entire population
	measurable, numerical data describing quantifiable information of a group
	having data that displays a distribution that is not symmetrical

Types of Data

The two types of data are qualitative ( ) and quantitative ( ).

Qualitative Data

of hair

favorite movie

brand of cell phone

QUANTITY

Quantitative Data

weight in pounds

number of customers

in seconds

Instruction | Describing Data

Slide 2

Populations and Samples

A **sample** is a portion of the [ ] (entire group) being studied.

Samples are examined to obtain information or make [ ] about the population.

Population	Sample
all students at a particular high school	40 students selected from throughout the school
all the soil in a specific forest	a test tube of soil from the forest
all batteries produced at a certain company	[ ] batteries

Slide 4

Random Samples vs. Biased Samples

Random Sample	Biased Sample
A sample in which each element in a population has an [ ] chance of being selected • Putting the names of all students in a hat and drawing 25 names	A sample in which the method used to form it results in samples that are not representative of the [ ] population • Surveying honor students at a school to find out the typical number of hours spent studying

Instruction | Describing Data

Slide 6

Data Collection Methods

There are a number of methods for collecting data.

Method	Description
	Asking people questions
Published data	Using data that has been published in a [ ]
	Conducting a controlled experiment
Observational study	Making observations without direction or [ ]
	Using a numerical model of a real-world phenomenon

Instruction | Describing Data

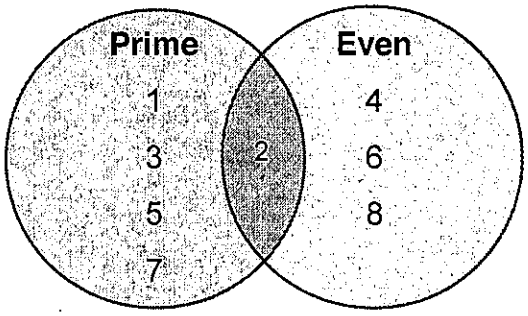
Slide 9

Displaying Qualitative Data

_____ data displays include _____ diagrams and two-way frequency tables.

Venn Diagram

Numbers 1 through 8



Two-Way _____ Table

Students at Briar Prep School

	9th Grade	10th Grade	Total
Males	59	48	107
Females	52	46	98
Total	111	94	205

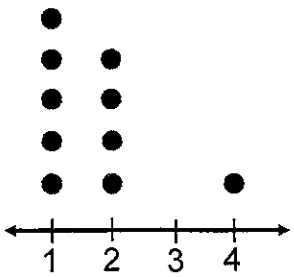
Slide 11

Displaying Quantitative Data

_____ data displays include dot plots, histograms, and box plots.

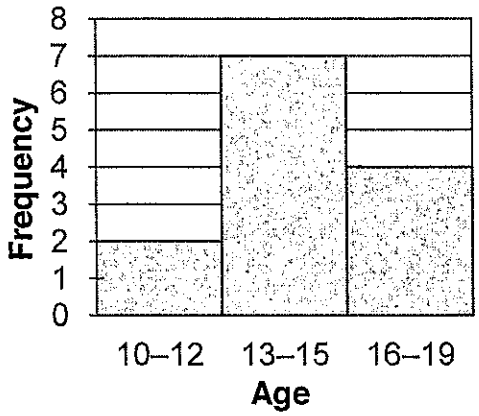
Dot Plot

Number of Languages Spoken at Home



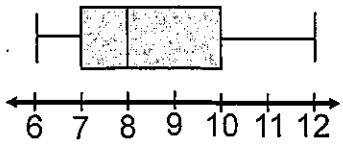
_____

Ages of Event Attendees



Box Plot

Number of Daily Phone Calls Received



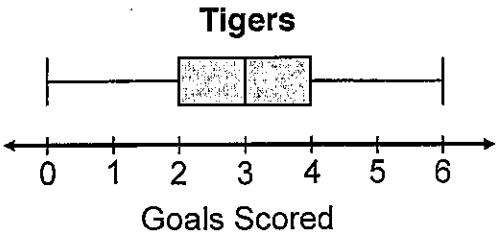
Instruction | Describing Data

Slide 11

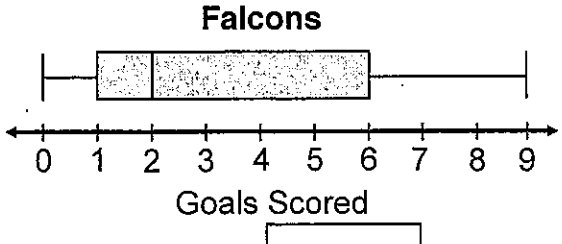
Symmetrical vs. Skewed Data Distribution

The distribution of data can be [ ]. If it is not symmetrical, it is **skewed**.

Symmetrical Data Distribution



Skewed Data Distribution

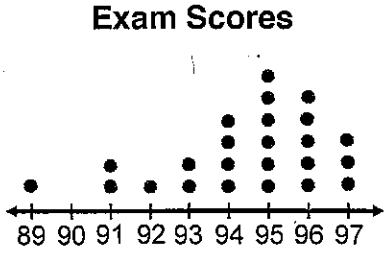


Skewed [ ]

Slide 13

Analyzing a Dot Plot

The exam scores for a 9th-grade English class, given as a percentage, are shown in the dot plot.



skewed [ ]

- What does the graph tell us about the exam scores for the 24 students?

  The students did quite well.

- Why does the data presented by this graph provide important information? Who might be interested in this data distribution?

  This gives the teacher an idea of how the students did on the exam.

- Does this dot plot represent a symmetric or skewed data distribution?

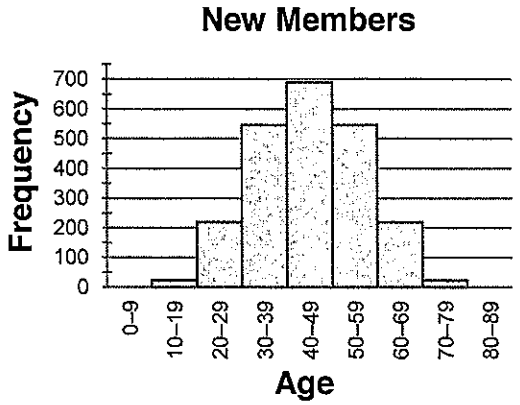
  This data distribution is skewed left.

Instruction | Describing Data

Slide 15

Analyzing a Histogram

A social media website tracks the ages of new members, as shown in the histogram.



- What does the graph tell us about new members of the social media website?

  Most new members are between ages [ ] and 69.

- Why does the data presented by this graph provide important information? Who might be interested in this data distribution?

  The website owners would be interested in this data so they could target their materials toward the correct age groups.

- Does this histogram represent a symmetric or skewed data distribution?

  This is a [ ] data distribution.

Summary | Describing Data

Lesson Question What is a sample, and what can it tell you about a population?

Answer

Slide 2

Review: Key Concepts

- A [ ] is a portion of the population (entire group) being studied.
- A random sample is a sample in which each element in a population has an equal chance of being selected.
- A [ ] sample is a sample in which the method used to form it results in samples that are not representative of the entire population.
- Data collection methods include surveys, published data, [ ], observational studies, and simulations.
- Data displays include Venn diagrams, two-way tables, dot plots, histograms, and box plots. The distribution of data can be symmetrical. If it is not symmetrical, it is [ ].

Summary | Describing Data

Use this space to write any questions or thoughts about this lesson.

Warm-Up | Introduction to Circles

Lesson Question

Lesson Goals

Investigate _____

Identify and describe _____ relating to circles.

Prove that all circles are _____.

Find _____ measures of arcs.

Warm-Up | Introduction to Circles

Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

_____ chord

_____ circle

_____ diameter

_____ radius

A. the set of all points in a plane that are equidistant from a given point

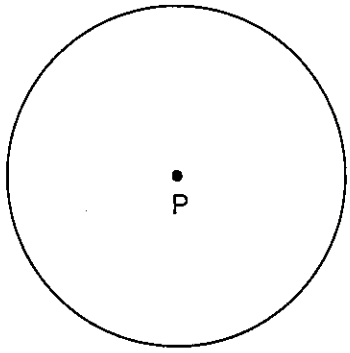
B. a segment that extends from the center of a circle to any point on the circle

C. a segment with both endpoints on a circle

D. a chord that passes through the center of the circle

Defining a Circle

A circle is the set of all points in a plane that are _____ from a given point, called the center.



- A circle is named by its _____. This circle is named circle P.
- Every point on the circle is the same _____ away from center P.
- We can notate it using a little circle symbol like this: ⊙P.

Instruction | Introduction to Circles

Slide 2

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

concentric circles	circles that lie in the same plane and have the same [ ]
point of tangency	the point of intersection between a circle and its [ ]
secant	a line or [ ] that intersects a circle at exactly [ ] points
similarity transformation	a composition of [ ], or isometric, transformations with one or more [ ]
tangent to a circle	a line, line segment, or ray that [ ] a circle at exactly one point and contains no points [ ] the circle

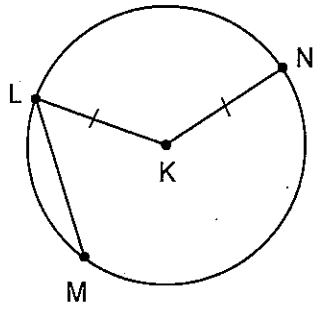
Instruction | Introduction to Circles

Slide 2

Radius of a Circle

A **radius** is a segment that extends from the center of a circle to any point on the circle.

For circle K, one radius would be [ ].



- All radii of the same circle are congruent.

  [ ] $\cong \overline{KL}$

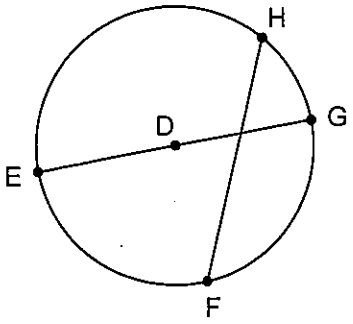
- Congruent circles have congruent [ ].
  - If circle K is congruent to another circle, then the radii of both circles are [ ].

Instruction | Introduction to Circles

Slide 2

Chords and Diameters

A **chord** is a segment with both endpoints on a circle. A **diameter** is a chord that passes through the [ ] of the circle.



Chords: $\overline{EG}$, [ ]

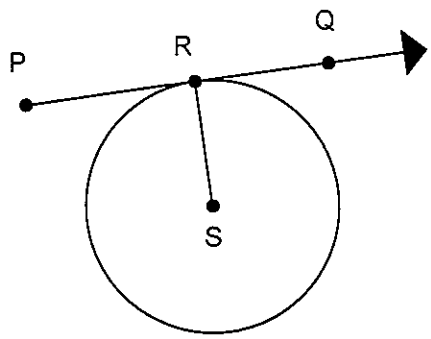
Diameter: [ ]

$\frac{1}{2}d =$ [ ] $\rightarrow d = 2r$

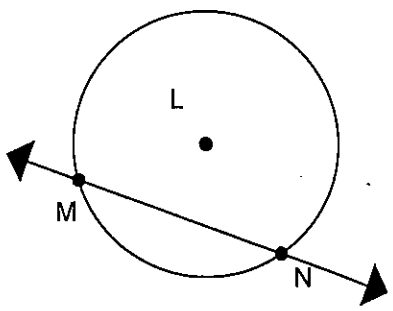
4

Tangents and Secants

A **tangent to a circle** is a line, line segment, or ray that intersects a circle at exactly 1 [ ], called the **point of tangency**, and contains no points [ ] the circle.



A **secant** is a line or [ ] that intersects a circle at exactly [ ] points.



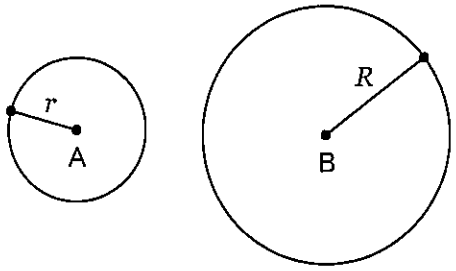
Instruction | Introduction to Circles

Slide 6

Proving That All Circles Are Similar

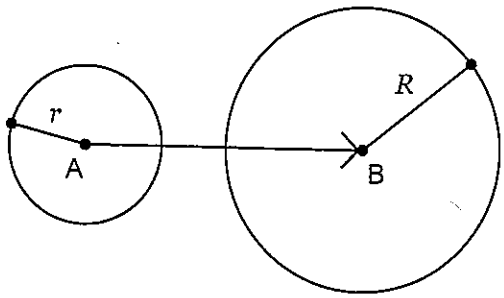
How can **similarity transformations** be used to prove that all circles are similar?

Remember that if there exists a sequence of similarity [ ], such as translations, rotations, reflections, or dilations, that will map circle A onto circle B, then the circles are [ ].



How can similarity transformations be used to prove that all circles are similar?

- [ ] circle A so that [ ] A maps onto center B, creating **concentric circles**, or circles that have the same center but different radii.

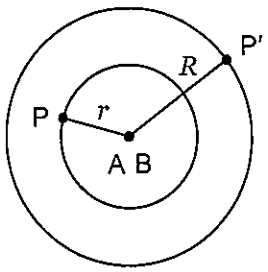


Instruction | Introduction to Circles

Slide 6

How can similarity transformations be used to prove that all circles are similar?

- Translate circle A so that the center maps onto center B, creating concentric circles.
- [ ] circle A′ by the factor $\frac{R}{r}$.



$$BP' = n \cdot A'P$$

$$n = \frac{[\ ]}{A'P}$$

Since the circles can be mapped onto one another using similarity transformations (a translation followed by a dilation), we can say that the circles are [ ].

Slide 9

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

	an arc whose measure is greater than or equal to 180 degrees
	an arc whose central angle has sides that intercept the circle at opposite endpoints of a diameter
	a part of a circle between two given endpoints
	an arc whose measure is less than 180 degrees
	an angle whose vertex is at the center of a circle and whose sides are radii of that circle

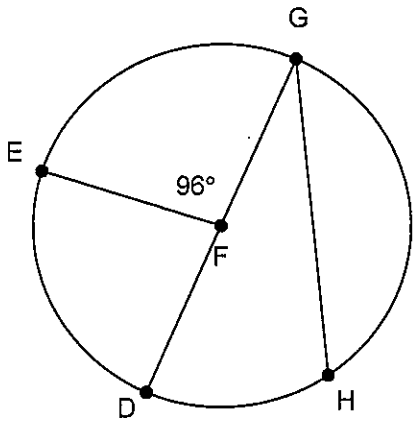
Instruction | Introduction to Circles

Slide 9

Central Angles and Arcs of a Circle

- A **central angle** is an angle whose vertex is at the [ ] of the circle and whose sides are radii of the circle.
  - $\angle EFG$ is a central angle, because its vertex is F and its sides, $\overline{EF}$ and $\overline{GF}$, are radii of the circle.
- An **arc of a circle** is a part of a circle between two given endpoints.
  - $\overset{\frown}{EG}$ is an arc of circle F.
- The degree measure of an arc is equal to the degree measure of the [ ] that intercepts it.

$m\overset{\frown}{EG} =$ [ ]

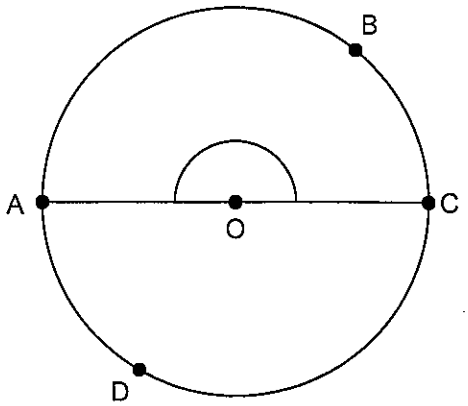


Instruction | Introduction to Circles

Slide 11

Semicircles

- A **semicircle** is an arc whose central angle has sides that intercept the circle at opposite endpoints of a diameter.
  - $\angle AOC$ is a central angle whose sides intersect the circle at opposite [ ] of a diameter.
  - We name semicircles using [ ] points.
  - The related arc is $\overset{\frown}{ABC}$.
  - $\overset{\frown}{ADC}$ is also a [ ].



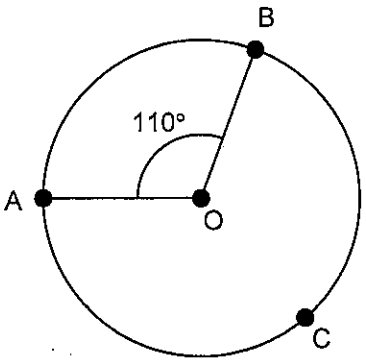
- A diameter forms a straight angle, or a 180-degree angle.
- The arc measure of any semicircle is [ ].
- The arc measure of any circle is [ ].

Instruction | Introduction to Circles

Slide 11

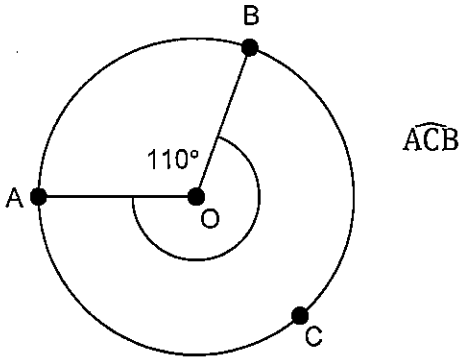
Minor and Major Arcs

- A **minor arc** is an arc whose measure is less than 180°.
  - It is named using the two [ ].
  - Its measure is equal to the measure of its related [ ] angle.



$m\widehat{AB}$ = [ ]

- A **major arc** is an arc whose measure is greater than or equal to 180°.
  - It is named using [ ] points.
  - Its measure is equal to 360° [ ] the measure of the minor arc with the same endpoints.

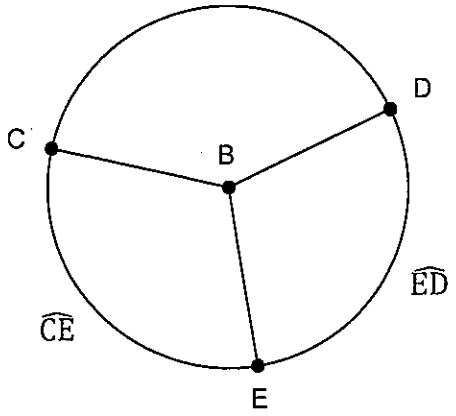


$m\widehat{ACB} = 360° - 110° =$ [ ]

Slide 13

Arc Addition Postulate

Arc addition postulate: The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

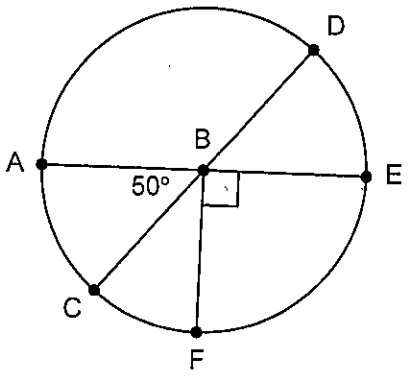


$m\widehat{CE} + m\widehat{ED} = m$ ☐

Slide 13

Using the Arc Addition Postulate

$\overline{AE}$ and $\overline{CD}$ are diameters of ⊙B. Find $m\widehat{DE}$, $m\widehat{CE}$, and $m\widehat{FAE}$.



Because we know that ∠DBE and ∠ABC are [ ] angles, by the vertical angles theorem, we know that these two angles are [ ].

$m\angle DBE = 50°$

$m\widehat{DE} =$ [ ]

By the arc addition postulate:

$$m\widehat{CE} + m\widehat{ED} = m\widehat{CED}$$

$$m\widehat{CE} + 50° = 180°$$

$$m\widehat{CE} =$$ [ ]

The measure of a major arc is equal to 360° minus the measure of the minor arc with the same endpoints.

$$m\widehat{FAE} = 360° - 90° =$$ [ ]

Summary | Introduction to Circles

Lesson Question

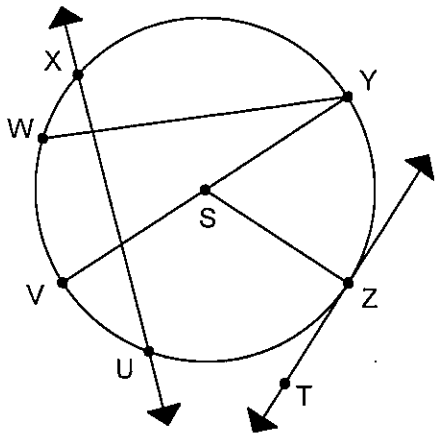
How are circles and their related geometric figures defined?

Answer

Slide 2

Review: Key Concepts

- **Terminology relating to circles:**
- Radius
  - Example: $\overline{SZ}$
- Chord
  - Example: $\overline{WY}$
- Diameter
  - Example: $\overline{VY}$
- [ ]
  - Example: $\overleftrightarrow{TZ}$
- Secant
  - Example: $\overleftrightarrow{XU}$
- Central angle
  - Example: $\angle YSZ$
- [ ] of a circle
  - Example of a minor arc: $\overset{\frown}{WV}$
  - Example of a major arc: $\overset{\frown}{WYZ}$



Summary | Introduction to Circles

Use this space to write any questions or thoughts about this lesson.