

## Hyperbolas Quiz Answer Key PDF

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**Which of the following are components of a hyperbola?**

- A. Vertices ✓
- B. Foci ✓
- C. Directrix
- D. Asymptotes ✓

**What is the standard form of a hyperbola with a horizontal transverse axis?**

- A.  $(x-h)^2/a^2 + (y-k)^2/b^2 = 1$
- B.  $(x-h)^2/a^2 - (y-k)^2/b^2 = 1$  ✓
- C.  $(y-k)^2/a^2 - (x-h)^2/b^2 = 1$
- D.  $(y-k)^2/a^2 + (x-h)^2/b^2 = 1$

**Which of the following is a property of hyperbolas?**

- A. They have a single focus.
- B. They have no asymptotes.
- C. They have two branches. ✓
- D. They have a center at the origin.

**Which of the following describes the foci of a hyperbola?**

- A. They are located on the conjugate axis.
- B. They are equidistant from the center. ✓
- C. They lie outside the branches of the hyperbola. ✓
- D. They are at the vertices.

**In a hyperbola, what is the term for the line that the curve approaches but never touches?**

- A. Axis
- B. Vertex
- C. Asymptote ✓**
- D. Focus

**Provide a real-world application of hyperbolas and explain its importance.**

**One real-world application of hyperbolas is in GPS technology, where they are used to calculate the position of a receiver based on the time difference of signal reception from multiple satellites.**

**Describe the process of finding the foci of a hyperbola given its standard equation.**

**1. Start with the standard form of the hyperbola:  $(x-h)^2/a^2 - (y-k)^2/b^2 = 1$  (horizontal) or  $(y-k)^2/a^2 - (x-h)^2/b^2 = 1$  (vertical). 2. Identify 'a' and 'c' using  $c = \sqrt{a^2 + b^2}$ . 3. For a horizontal hyperbola, the foci are at  $(h \pm c, k)$ ; for a vertical hyperbola, they are at  $(h, k \pm c)$ .**

**Which of the following can be used to identify a hyperbola from its equation?**

- A. The presence of subtraction between squared terms. ✓**
- B. The presence of addition between squared terms.
- C. The equation is set equal to zero.
- D. The equation is set equal to one. ✓**

**Explain how the orientation of a hyperbola is determined from its equation.**

**The orientation of a hyperbola is determined by whether the x or y variable is positive in its standard equation.**

**In the context of hyperbolas, which of the following are true about the foci?**

- A. They are inside the branches.
- B. They are equidistant from the center. ✓**
- C. They are used to define the hyperbola. ✓**
- D. They lie on the transverse axis. ✓**

**In the equation  $(x-h)^2/a^2 - (y-k)^2/b^2 = 1$ , what does h represent?**

- A. Vertex
- B. Focus
- C. Center x-coordinate ✓**
- D. Asymptote slope

**How do the asymptotes of a hyperbola help in sketching its graph?**

The asymptotes help in sketching the graph of a hyperbola by providing reference lines that the branches of the hyperbola approach, allowing for a more accurate representation of its shape.

**Which statements are true about the transverse axis of a hyperbola?**

- A. It is perpendicular to the conjugate axis. ✓**
- B. It passes through the foci. ✓**
- C. It is the longest axis of the hyperbola.
- D. It connects the vertices. ✓**

**Which of the following equations represent hyperbolas?**

- A.  $x^2/4 - y^2/9 = 1$  ✓**
- B.  $y^2/16 - x^2/25 = 1$  ✓**
- C.  $x^2/9 + y^2/4 = 1$
- D.  $x^2 - y^2 = 0$

**Compare and contrast the properties of hyperbolas and ellipses.**

Ellipses have the general equation  $(x^2/a^2) + (y^2/b^2) = 1$ , while hyperbolas have the equation  $(x^2/a^2) - (y^2/b^2) = 1$ . Ellipses are bounded and have a major and minor axis, while hyperbolas are unbounded and consist of two separate branches.

**Discuss the significance of the transverse and conjugate axes in the geometry of hyperbolas.**

The transverse axis is significant as it determines the direction in which the hyperbola opens, while the conjugate axis helps in defining the asymptotes and the overall structure of the hyperbola.

**What are the characteristics of a hyperbola's asymptotes?**

- A. They intersect at the center. ✓
- B. They are parallel to each other.
- C. They form a cross through the center. ✓
- D. They are tangent to the hyperbola.

Which axis is the line segment connecting the vertices of a hyperbola?

- A. Major axis
- B. Minor axis
- C. Transverse axis ✓
- D. Conjugate axis

What is the equation of the asymptotes for a hyperbola with a vertical transverse axis?

- A.  $y = k \pm (b/a)(x-h)$
- B.  $x = h \pm (b/a)(y-k)$
- C.  $y = k \pm (a/b)(x-h)$
- D.  $x = h \pm (a/b)(y-k)$  ✓

What is the relationship between a, b, and c in a hyperbola?

- A.  $c^2 = a^2 - b^2$
- B.  $c^2 = a^2 + b^2$  ✓
- C.  $c^2 = b^2 - a^2$
- D.  $c^2 = a^2 \times b^2$