

What's Missing?

The Exciting Game of Seeing What Isn't There!

How to Play

Each question that follows describes a conic section, and you are required to write the equation for it in vertex form. However, each question is missing a piece of information that you will need to do this! Your job is to decide what that attribute is, and once it is provided to you, write that equation! Other contestants, be aware: there are always multiple attributes that could be the correct answer, so be ready to buzz in for bonus points!

Question 1:

- ▶ A circle is centered at $(1, 1)$. What is missing?

Question 1 Possible Answers:

- ▶ A circle is centered at $(1, 1)$. What is missing?
 - ▶ The radius (r)
 - ▶ The diameter

Question 2:

- ▶ An ellipse is centered at $(4, 2)$, with $a = 5$. What is missing?

Question 2 Possible Answers:

- ▶ An ellipse is centered at $(4, 2)$, with $a = 5$. What is missing?
 - ▶ b
 - ▶ Length of the minor axis
 - ▶ Either of the two co-vertices
 - ▶ c

Question 3:

- ▶ An ellipse centered at the origin has a major axis of 16 and a minor axis of 12. What is missing?

Question 3 Possible Answers:

- ▶ An ellipse centered at the origin has a major axis of 16 units in length and a minor axis of 12 units in length. What is missing?
 - ▶ Ellipse type
 - ▶ Either of the two vertices
 - ▶ Either of the two co-vertices

Question 4:

- ▶ An circle has a diameter of 12. What is missing?

Question 4 Possible Answers:

- ▶ An circle has a diameter of 12. What is missing?
 - ▶ The center
 - ▶ Diameter endpoints

Question 5:

- ▶ An ellipse centered at $(-1, -3)$ has a co-vertex at $(-5, -3)$. What is missing?

Question 5 Possible Answers:

- ▶ An ellipse centered at $(-1, -3)$ has a co-vertex at $(-5, -3)$. What is missing?
 - ▶ a
 - ▶ Length of the major axis
 - ▶ Either of the two vertices

Question 6:

- ▶ An ellipse has vertices at $(7, 5)$ and $(1, 5)$. What is missing?

Question 6 Possible Answers:

- ▶ An ellipse has vertices at $(7, 5)$ and $(1, 5)$. What is missing?
 - ▶ b
 - ▶ Length of the minor axis
 - ▶ Either of the two co-vertices
 - ▶ c

Question 7:

- ▶ An ellipse is centered at $(5, -2)$, with $c = 8$. What is missing?

Question 7 Possible Answers:

- ▶ An ellipse is centered at $(5, -2)$, with $c = 8$. What is missing?
 - ▶ a
 - ▶ b
 - ▶ Length of the major axis
 - ▶ Length of the minor axis
 - ▶ Either of the two vertices
 - ▶ Either of the two co-vertices

Nothing's Missing

Good old-fashioned math. Math. Math.

Question 8:

- ▶ Express the following equation in vertex form:

$$x^2 + y^2 - 10x = 33 + 4y$$

- ▶ What kind of conic section is it?

Question 9:

- ▶ Express the following equation in vertex form:

$$9x^2 + 4y^2 - 36x + 24y + 36 = 0$$

- ▶ What kind of conic section is it?

Question 10:

- ▶ Given a circle with diameter endpoints $(2, 0)$ and $(6, 0)$:
 - ▶ What is its center?
 - ▶ What is its radius?
 - ▶ What is the equation in vertex form?

Question 11:

- ▶ Express the following equation in vertex form:

$$4x^2 + 16y = 10 - 4y^2$$

- ▶ What kind of conic section is it?

Question 12:

- ▶ Given a circle with diameter endpoints $(2, 1)$ and $(6, 3)$:
 - ▶ What is its center?
 - ▶ What is its radius?
 - ▶ What is the equation in vertex form?

Question 13:

- ▶ Given an ellipse with vertices $(1, 1)$ and $(-7, 1)$, and co-vertices $(-3, 3)$ and $(3, -1)$:
 - ▶ What is its center?
 - ▶ What type of ellipse is it?
 - ▶ What is the equation in vertex form?

Question 14:

- ▶ How many islands are in the Republic of Maldives?

Question 15:

- ▶ How do you say 'test' or 'exam' in Hungarian?