

Precalculus · Conic Sections: Parabolas, Ellipses and Hyperbolas · Quiz

Common Core G-GPE.A.1, G-GPE.A.2, G-GPE.A.3 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus conic sections quiz asks 10 multiple-choice questions on conic sections: parabolas, ellipses and hyperbolas, and each answer comes with a short explanation.

Ten quick multiple-choice questions on circles, parabolas, ellipses and hyperbolas: centers, foci, asymptotes, graphs and completing the square. Choose one answer for each, then read the explanation to see which common slip each wrong option represents.

Precalculus Common Core: G-GPE.A.1 · G-GPE.A.2 · G-GPE.A.3

Questions

Question 1

What is the center of the circle $(x-3)^2+(y+2)^2=16$?

- A. $(3, -2)$
- B. $(-3, 2)$
- C. $(3, 2)$
- D. $(-3, -2)$

Question 2

What is the radius of the circle $x^2+y^2-4x+2y-4=0$?

- A. 9
- B. 3
- C. 4
- D. 6

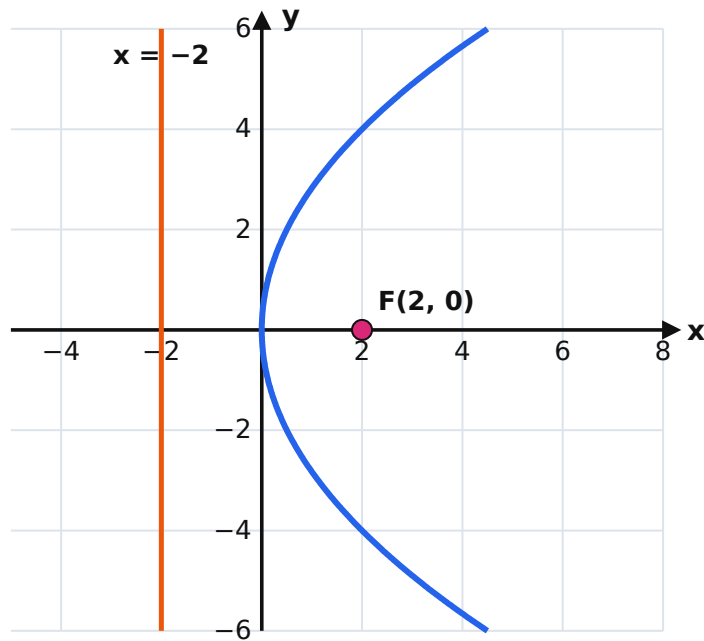
Question 3

What is the focus of the parabola $x^2=12y$?

- A. $(0, 12)$
- B. $(3, 0)$
- C. $(0, 6)$
- D. $(0, 3)$

Question 4

The graph shows a parabola with focus $(2, 0)$ and directrix $x = -2$. Which equation describes it?



Focus and directrix of a parabola.

- A. $x^2 = 8y$
- B. $y^2 = 8x$
- C. $y^2 = 4x$
- D. $y^2 = -8x$

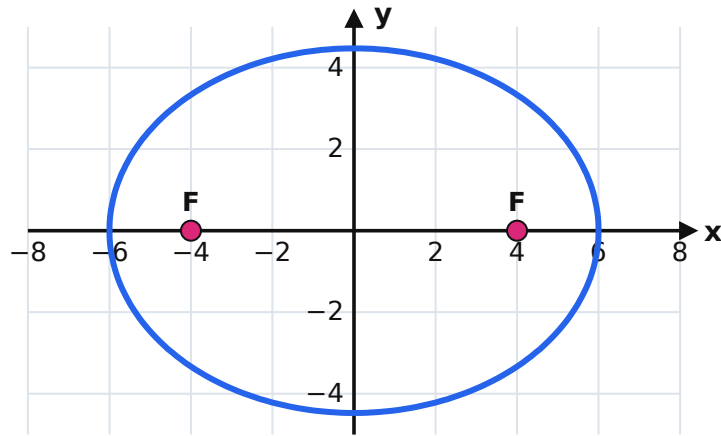
Question 5

What are the foci of $\frac{x^2}{25} + \frac{y^2}{9} = 1$?

- A. $(\pm 5, 0)$
- B. $(\pm 3, 0)$
- C. $(\pm 4, 0)$
- D. $(\pm\sqrt{34}, 0)$

Question 6

For the ellipse $\frac{x^2}{36} + \frac{y^2}{20} = 1$ shown, what is the sum of the distances from any point on the ellipse to the two foci?



An ellipse with foci F.

- A. 6
- B. 8
- C. 12
- D. 16

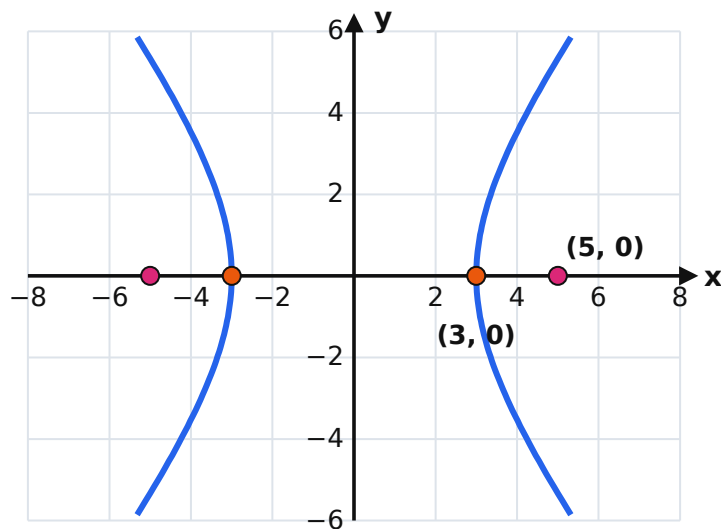
Question 7

What are the asymptotes of $\frac{x^2}{16} - \frac{y^2}{9} = 1$?

- A. $y = \pm \frac{3}{4}x$
- B. $y = \pm \frac{4}{3}x$
- C. $y = \pm \frac{9}{16}x$
- D. $y = \pm \frac{16}{9}x$

Question 8

A hyperbola has vertices $(\pm 3, 0)$ and foci $(\pm 5, 0)$, as shown. Which equation matches?



Vertices orange, foci pink.

- A. $\frac{x^2}{16} - \frac{y^2}{9} = 1$
- B. $\frac{x^2}{9} + \frac{y^2}{16} = 1$
- C. $\frac{y^2}{9} - \frac{x^2}{16} = 1$
- D. $\frac{x^2}{9} - \frac{y^2}{16} = 1$

Question 9

Completing the square on $4x^2 + y^2 - 8x + 6y + 9 = 0$ shows which conic?

- A. An ellipse
- B. A circle
- C. A parabola
- D. A hyperbola

Question 10

Which rule defines a hyperbola?

- A. The sum of the distances to two fixed points is constant
- B. Each point is equally far from a fixed point and a fixed line
- C. The absolute difference of the distances to two fixed points is constant
- D. Each point is the same distance from one fixed point

Answer key

1. **A** - Read $(x-h)^2+(y-k)^2$: $h=3$ and $y+2=y-(-2)$ gives $k=-2$. Signs inside the parentheses are opposite to the center.
2. **B** - Completing squares: $(x-2)^2+(y+1)^2=4+4+1=9$, so $r=\sqrt{9}=3$. Reporting 9 forgets the square root.
3. **D** - $4p=12$, so $p=3$. The parabola opens up, so the focus is $(0, 3)$. Using 12 directly or $p=6$ are common slips.
4. **B** - $p=2$ and the parabola opens right, so $y^2=4px=8x$. $x^2=8y$ opens upward.
5. **C** - $c^2=a^2-b^2=25-9=16$, so $c=4$. Adding the squares ($\sqrt{34}$) is the hyperbola formula.
6. **C** - The sum equals $2a=2(6)=12$. Giving $a=6$ forgets the factor 2; $8=2c$ is the distance between the foci.
7. **A** - The slopes are $\pm\frac{b}{a}=\pm\frac{3}{4}$. $\pm\frac{4}{3}$ inverts the ratio.
8. **D** - $a=3$, $c=5$, so $b^2=c^2-a^2=16$. The branches open left and right, so x^2 comes first. Swapping a and b gives the second option.
9. **A** - $4(x-1)^2+(y+3)^2=4$, so $(x-1)^2+\frac{(y+3)^2}{4}=1$: both squares are positive but the denominators differ, which gives an ellipse, not a circle.
10. **C** - A hyperbola uses a constant difference of focal distances. A constant sum is the ellipse, point-and-line equality is the parabola, and one fixed point is the circle.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Circle: $(x-h)^2+(y-k)^2=r^2$, from the distance formula.
- Parabola: $x^2=4py$ has focus $(0, p)$ and directrix $y=-p$.
- Ellipse: $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ with $c^2=a^2-b^2$; the distance sum is $2a$.
- Hyperbola: $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ with $c^2=a^2+b^2$ and asymptotes $y=\pm\frac{b}{a}x$.
- Complete the square in x and y to rewrite a general conic equation in standard form.

How to use this precalculus conic sections quiz

Retake this precalculus conic sections quiz until every answer is right, then move on to the worksheet and the test.

