

Precalculus · Conic Sections: Parabolas, Ellipses and Hyperbolas · Test Answer Key

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

This precalculus conic sections test answer key gives the full solution and the scoring guide for each of the 8 test questions on conic sections: parabolas, ellipses and hyperbolas.

Every solution comes with a scoring guide showing how the 20 points are awarded. Give partial credit for correct setup with an arithmetic slip, and do not penalize the same error twice in later parts of one question.

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

Precalculus Conic Sections Test Answer Key: questions 1-5

Question 1: Equations of circles (2 points)

- a. $(x+3)^2+(y-4)^2=36$.
- b. Center $(1, -5)$; $r=\sqrt{18}=3\sqrt{2}\approx 4.24$.

Scoring: (a) 1 point. (b) 0.5 for the center, 0.5 for the radius (accept $\sqrt{18}$).

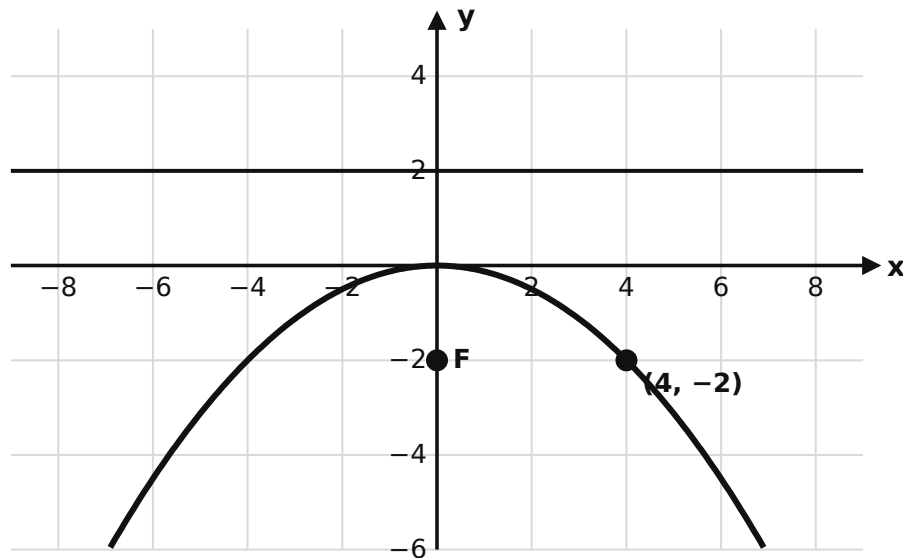
Question 2: Completing the square for a circle (3 points)

- a. $(x^2+6x+9)+(y^2-8y+16)=11+9+16$, so $(x+3)^2+(y-4)^2=36$.
- b. Center $(-3, 4)$, radius 6.
- c. $(3+3)^2+(4-4)^2=36+0=36$. Yes, the point lies on the circle.

Scoring: (a) 1 point for both squares completed correctly. (b) 1 point. (c) 1 point for substituting and concluding.

Question 3: Parabola from focus and directrix (3 points)

- a. The vertex is $(0, 0)$, halfway between focus and directrix, and $p=-2$ (the focus is below). So $x^2=4py=-8y$.
- b. $16=-8y$, so $y=-2$. The point $(4, -2)$ is level with the focus, 4 from it and $2-(-2)=4$ from the directrix.



The parabola opens downward.

Scoring: (a) 1 point for the vertex and $p = -2$, 1 point for $x^2 = -8y$. (b) 1 point.

Question 4: Parabola features (2 points)

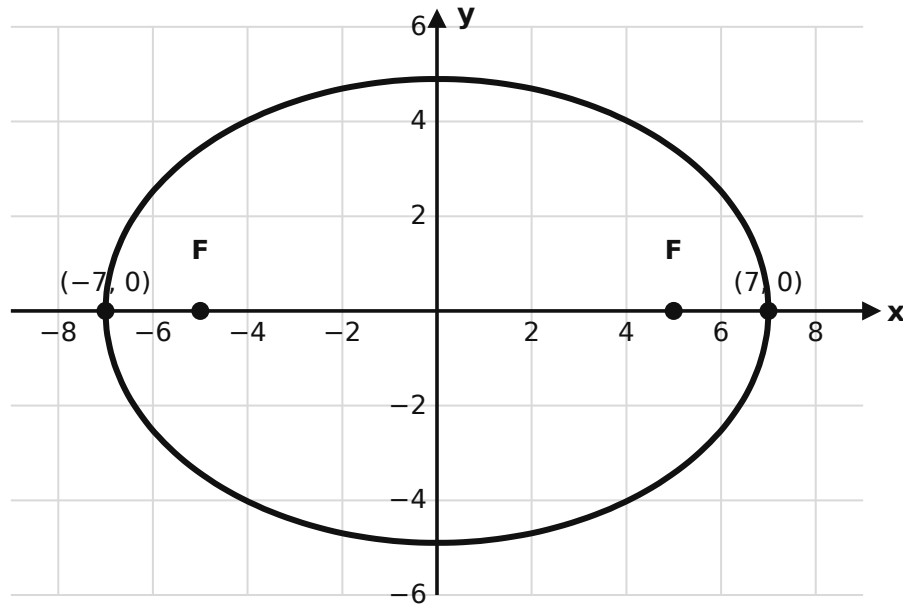
$4p = 12$, so $p = 3$; the parabola opens right.

Focus $(3, 0)$; directrix $x = -3$.

Scoring: 1 point for the focus and 1 point for the directrix.

Question 5: Ellipse features (3 points)

- $a^2 = 49$, so $a = 7$: vertices $(\pm 7, 0)$.
- $c^2 = 49 - 24 = 25$, $c = 5$: foci $(\pm 5, 0)$.
- The sum is $2a = 14$.



Vertices and foci.

Scoring: (a) 1 point. (b) 1 point, with the calculation $c^2 = a^2 - b^2$. (c) 1 point.

Precalculus Conic Sections Test Answer Key: questions 6-8

Question 6: Ellipse from its foci (2 points)

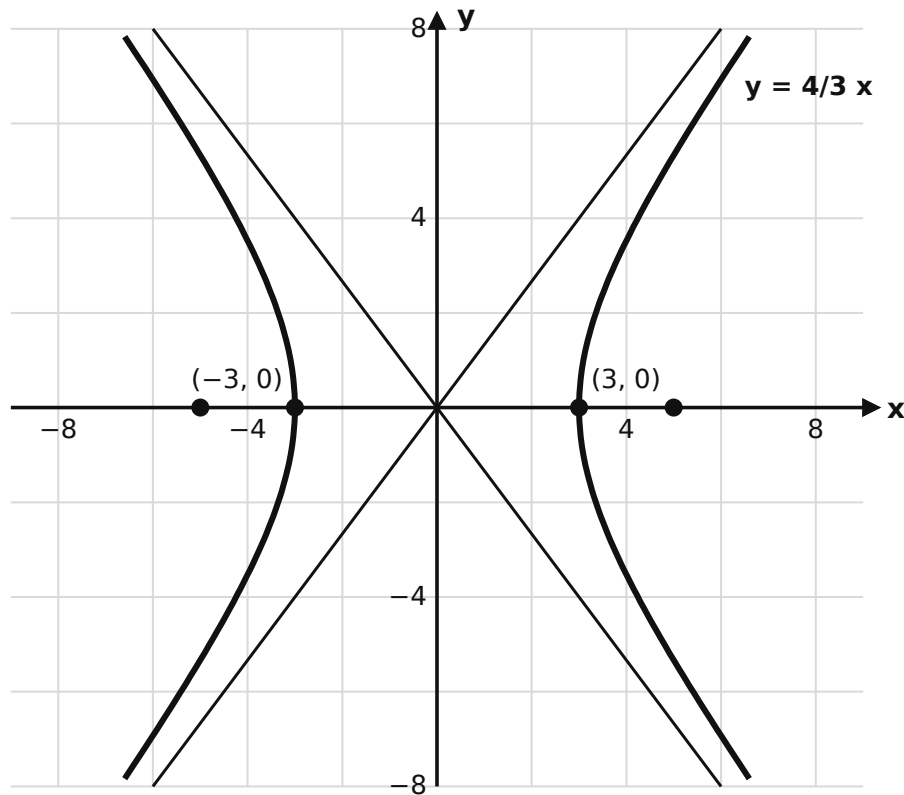
$2a = 10$, so $a = 5$. The foci are on the y -axis with $c = 4$, so $b^2 = 25 - 16 = 9$. The major axis is vertical, so the larger denominator goes under y .

$$\frac{x^2}{9} + \frac{y^2}{25} = 1.$$

Scoring: 1 point for $a = 5$ and $b^2 = 9$; 1 point for the equation with 25 under y^2 .

Question 7: Hyperbola features (3 points)

- $a^2 = 9$: vertices $(\pm 3, 0)$.
- $c^2 = 9 + 16 = 25$, $c = 5$: foci $(\pm 5, 0)$.
- $b = 4$, so $y = \pm \frac{b}{a}x = \pm \frac{4}{3}x$.



Vertices, foci and asymptotes.

Scoring: (a) 1 point. (b) 1 point with $c^2 = a^2 + b^2$. (c) 1 point for both signs.

Question 8: Identify a conic (2 points)

- $9(x^2 - 4x + 4) - 16(y^2 + 2y + 1) = 124 + 36 - 16 = 144$, so $\frac{(x-2)^2}{16} - \frac{(y+1)^2}{9} = 1$.
- It is a hyperbola with center $(2, -1)$ (and $a = 4$, $b = 3$, $c = 5$).

Scoring: (a) 1 point for completing both squares with the right right-hand side. (b) 0.5 for "hyperbola", 0.5 for the center.

Scoring summary

Total
20 points: add the points of every question of this precalculus conic sections test answer key.

How to use this precalculus conic sections test answer key

Use this precalculus conic sections test answer key to score the test fairly and to see which

skills need more practice.

