

Precalculus - Conic Sections - Test Answer Key

Common Core G-GPE.A.1, G-GPE.A.2, G-GPE.A.3 · maths-pdf.fr/en/

Worked solutions and scoring notes for the 9-question conic sections test. Use the scoring line under each solution to award partial credit.

Precalculus · Common Core State Standards: **G-GPE.A.1, G-GPE.A.2, G-GPE.A.3**

Question 1 - Circles [2 pts]

(a) $(x+1)^2+(y-4)^2=9$. (b) $(x^2+8x+16)+(y^2-2y+1)=-8+16+1=9: (x+4)^2+(y-1)^2=9$.

(a) $(x+1)^2+(y-4)^2=9$; **(b) center** $(-4,1)$, **radius** 3

Scoring: 1 point each.

Question 2 - Parabola parts [2 pts]

$4p=-16, p=-4$. The parabola opens down.

Focus $(0,-4)$; **directrix** $y=4$

Scoring: 1 point each.

Question 3 - Parabola from focus and directrix [2 pts]

Vertex $(0,0)$, $p=-2$, opens left: $y^2=4px$.

$y^2=-8x$

Scoring: 1 point for p and orientation, 1 point for the equation.

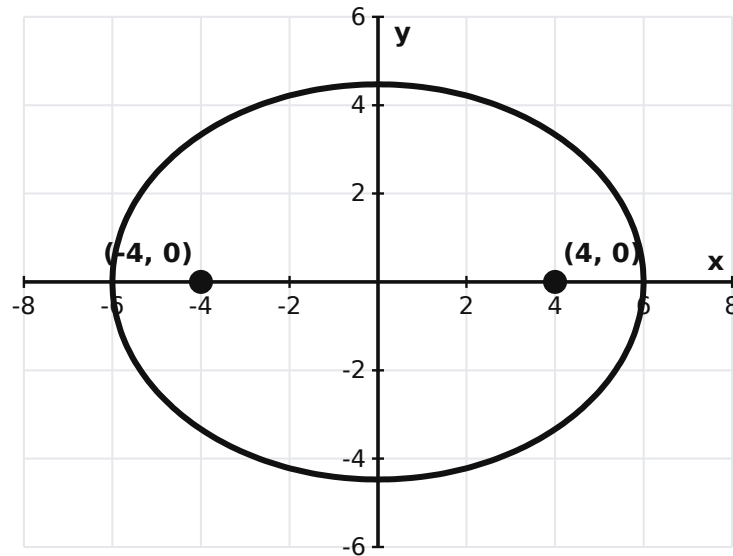
Question 4 - Ellipse foci [2 pts]

Divide by 400: $\frac{x^2}{25}+\frac{y^2}{16}=1$. $c=\sqrt{25-16}=3$.

$\frac{x^2}{25}+\frac{y^2}{16}=1$; **foci** $(\pm 3,0)$

Scoring: 1 point for standard form, 1 point for foci.

Question 5 - Read an ellipse [3 pts]



Foci at $(\pm 4, 0)$.

(a) $a = 6$, $b = \sqrt{20} = 2\sqrt{5}$. (b) $c = \sqrt{36 - 20} = 4$; foci $(\pm 4, 0)$. (c) $2a = 12$.

$a = 6$, $b = 2\sqrt{5}$; $c = 4$, **foci** $(\pm 4, 0)$; 12

Scoring: 1 point for each part.

Question 6 - Hyperbola parts [2 pts]

$a = 5$, $b = 12$. Vertices $(\pm 5, 0)$. Asymptotes $y = \pm \frac{12}{5}x$.

$(\pm 5, 0)$; $y = \pm \frac{12}{5}x$

Scoring: 1 point each.

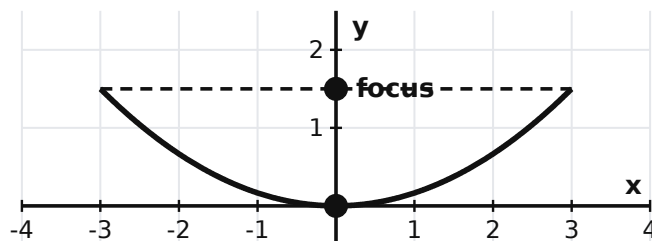
Question 7 - Hyperbola from vertices and foci [2 pts]

$a = 3$, $c = 5$, $b^2 = 25 - 9 = 16$. The branches open up and down, so y^2 comes first.

$$\frac{y^2}{9} - \frac{x^2}{16} = 1$$

Scoring: 1 point for b squared, 1 point for the equation.

Question 8 - Satellite dish [3 pts]



$p = 1.5$ so the focus is 1.5 feet above the vertex.

(a) The rim point is $(3, 1.5)$: $9 = 4p(1.5)$, so $p = 1.5$ and $x^2 = 6y$. (b) The focus is $(0, 1.5)$. (c) $y = \frac{4}{6} \approx 0.67$.

$$x^2 = 6y; (0, 1.5); 0.67 \text{ ft}$$

Scoring: 1 point for each part.

Question 9 - Classify conics [2 pts]

(a) Divide by 3: $x^2 + y^2 = 9$, a circle of radius 3. (b) Opposite signs: a hyperbola.

(a) circle; (b) hyperbola

Scoring: 1 point each.

Total
20 points