

Precalculus - Conic Sections - Worksheet

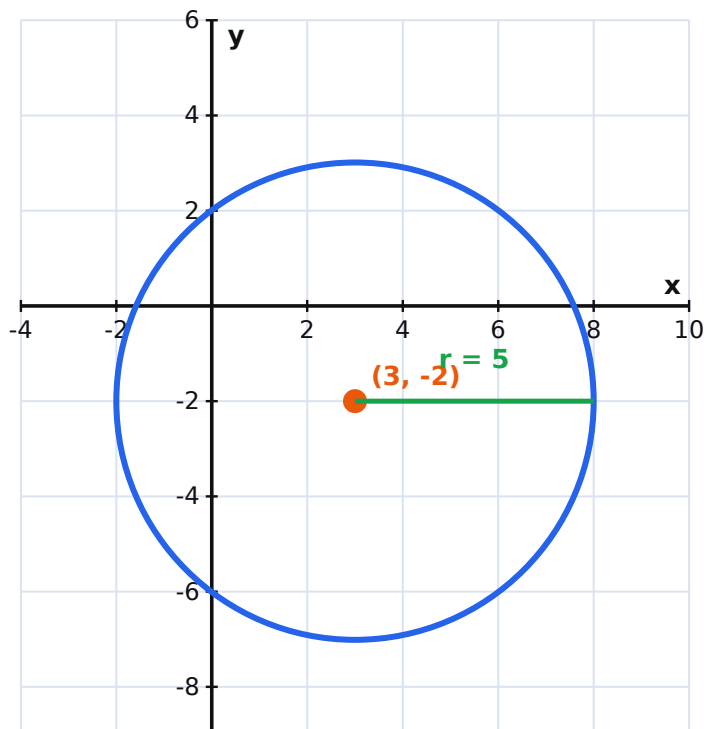
Common Core G-GPE.A.1, G-GPE.A.2, G-GPE.A.3 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice conic sections (Common Core G-GPE.A.1, G-GPE.A.2 and G-GPE.A.3). You will write equations of circles, parabolas, ellipses and hyperbolas, find foci, directrices and asymptotes, complete the square and solve applications.

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

Exercise 1 - Equation of a circle



A circle on the plane.

Write the equation of the circle with center $(3, -2)$ and radius 5.

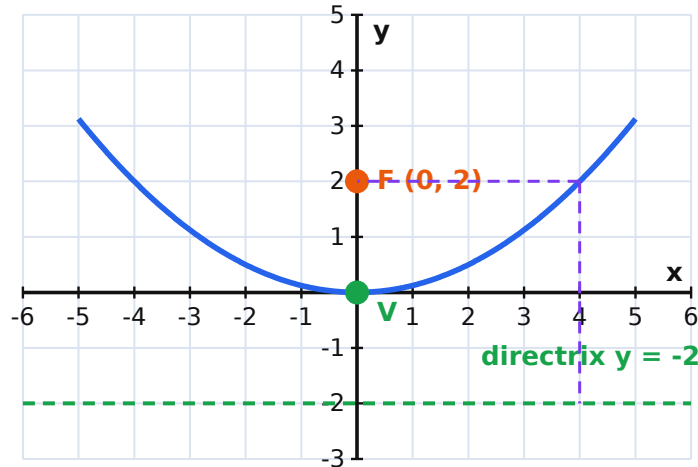
Exercise 2 - Center and radius

Find the center and radius of $x^2 + y^2 - 6x + 4y - 12 = 0$.

Exercise 3 - Circle through a point

A circle has center $(-2,6)$ and passes through $(1,2)$. Write its equation.

Exercise 4 - Parts of a parabola



Parabola $x^2 = 8y$.

Find the vertex, focus and directrix of $x^2 = 8y$.

Exercise 5 - Parabola opening left

Find the focus and directrix of $y^2 = -12x$.

Exercise 6 - Equation from focus and directrix

Write the equation of the parabola with focus $(0,-5)$ and directrix $y = 5$.

Exercise 7 - Shifted parabola

Find the vertex, focus and directrix of $(x-2)^2 = 4(y+1)$.

Exercise 8 - Complete the square for a parabola

Write $y = x^2 - 4x + 7$ in the form $(x-h)^2 = 4p(y-k)$ and find the focus.

Exercise 9 - Parts of an ellipse

For $\frac{x^2}{100} + \frac{y^2}{36} = 1$, find a , b , c , the vertices and the foci.

Exercise 10 - Vertical ellipse

Find the foci of $\frac{x^2}{20} + \frac{y^2}{36} = 1$.

Exercise 11 - Ellipse from vertices and foci

Write the equation of the ellipse with vertices $(\pm 6, 0)$ and foci $(\pm 4, 0)$.

Exercise 12 - Shifted ellipse

For $\frac{(x-1)^2}{9} + \frac{(y+2)^2}{4} = 1$, find the center and the foci.

Exercise 13 - Standard form of an ellipse

Write $4x^2 + 9y^2 = 36$ in standard form.

Exercise 14 - Parts of a hyperbola

For $\frac{x^2}{49} - \frac{y^2}{576} = 1$, find the vertices, the foci and the asymptotes.

Exercise 15 - Vertical hyperbola

For $\frac{y^2}{25} - \frac{x^2}{144} = 1$, find the foci and the asymptotes.

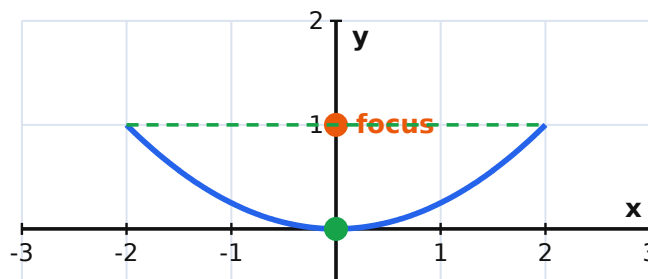
Exercise 16 - Hyperbola from vertices and foci

Write the equation of the hyperbola with vertices $(\pm 4, 0)$ and foci $(\pm 5, 0)$.

Exercise 17 - Identify the conic

Identify each as a circle, parabola, ellipse or hyperbola: (a) $x^2 + y^2 = 9$; (b) $y = 2x^2$; (c) $4x^2 - y^2 = 16$; (d) $5x^2 + 2y^2 = 10$.

Exercise 18 - Satellite dish

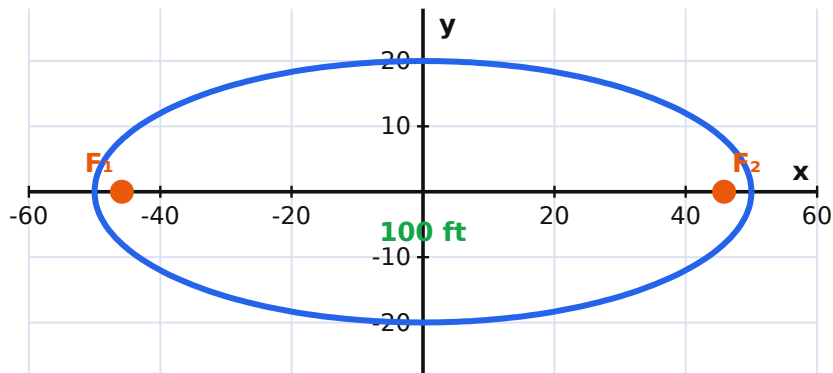


Cross-section of a dish.

A parabolic satellite dish is 4 ft across and 1 ft deep. Model it by $x^2 = 4py$ with the vertex at

the origin. Find P and how far above the vertex the receiver (the focus) should be.

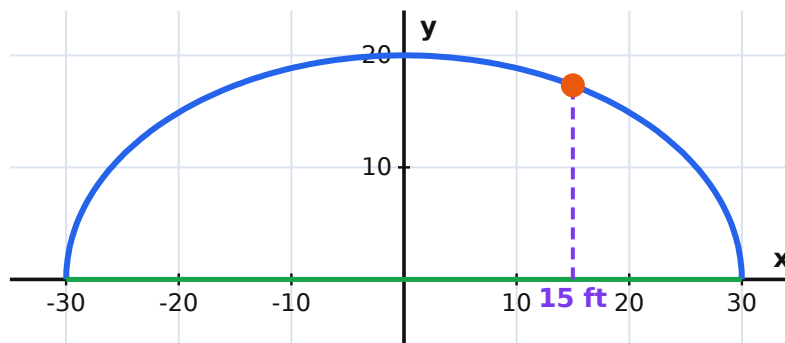
Exercise 19 - Whispering gallery



A whispering gallery with two foci.

A whispering gallery is a half-ellipse hall 100 ft long and 40 ft wide. Whispers at one focus carry to the other. Find the distance between the foci to the nearest tenth of a foot.

Exercise 20 - Elliptical arch



A semi-elliptical arch.

A bridge arch is the upper half of an ellipse 60 ft wide and 20 ft high. Write its equation with the center at the origin, and find the height 15 ft from the center to the nearest hundredth.