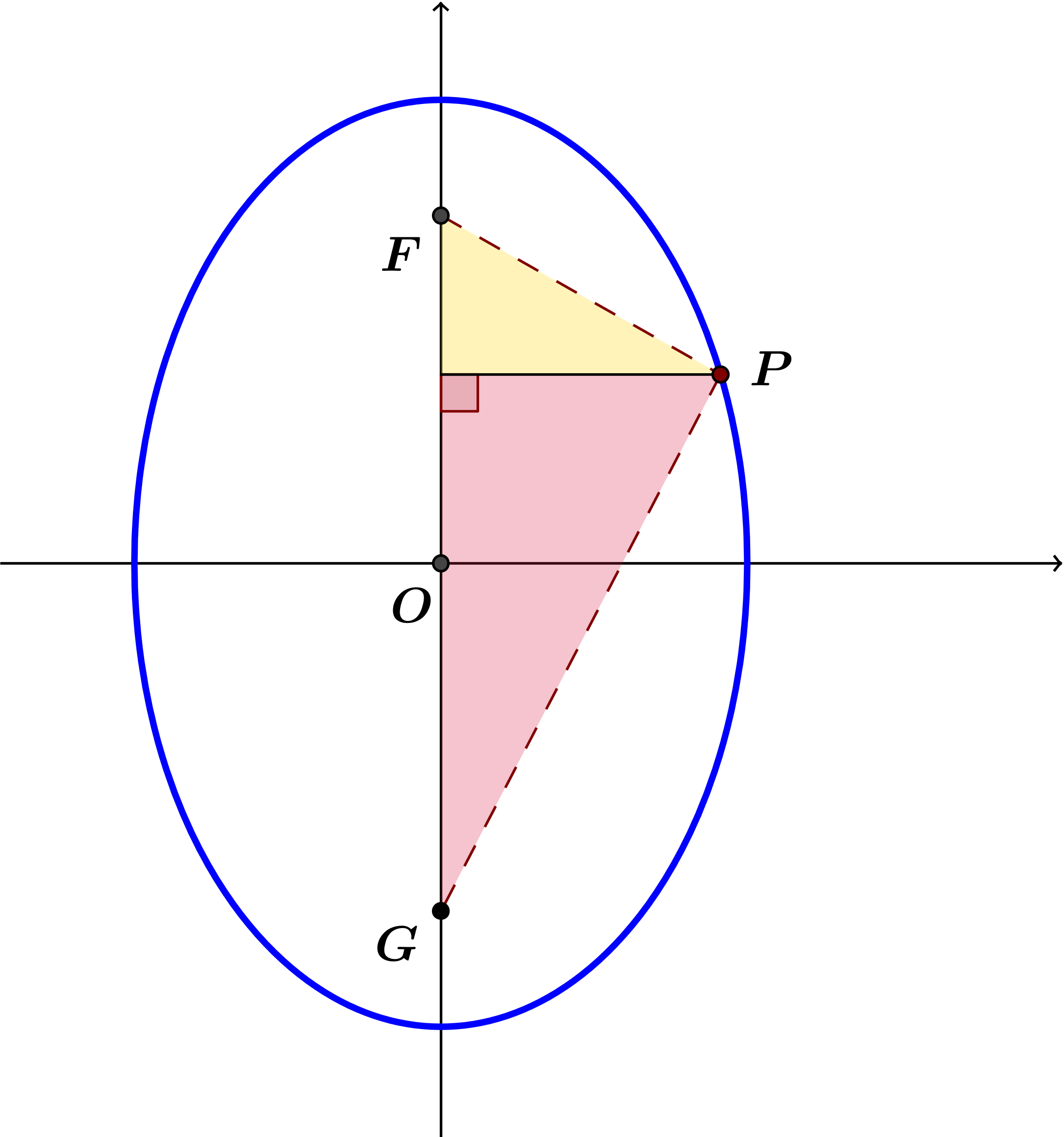
Lesson 7: Curves from Geometry

Classwork

Exercise

Points and are located at and . Let be a point such that . Use this information to show that the equation of the ellipse is .



Problem Set

1. Derive the equation of the ellipse with the given foci and that passes through point . Write your answer in standard form: .
   1. The foci are and , and point satisfies the condition .
   2. The foci are and , and point satisfies the condition .
   3. The foci are and , and point satisfies the condition .
   4. The foci are and , and point satisfies the condition .
   5. The foci are and , and point satisfies the condition .
   6. The foci are and , and point satisfies the condition .
2. Recall from Lesson 6 that the semi-major axes of an ellipse are the segments from the center to the farthest vertices, and the semi-minor axes are the segments from the center to the closest vertices. For each of the ellipses in Problem 1, find the lengths and of the semi-major axes.
3. Summarize what you know about equations of ellipses centered at the origin with vertices , , , and .
4. Use your answer to Problem to find the equation of the ellipse for each of the situations below.
   1. An ellipse centered at the origin with -intercepts , and -intercepts , .
   2. An ellipse centered at the origin with -intercepts , and -intercepts , .
5. Examine the ellipses and the equations of the ellipses you have worked with, and describe the ellipses with equation   
    in the three cases , , and .
6. Is it possible for to have foci at and for some real number ?
7. For each value of specified in parts (a)–(e), plot the set of points in the plane that satisfy the equation   
   .
   1. Make a conjecture: Which points in the plane will satisfy the equation
   2. Explain why your conjecture in part (g) makes sense algebraically.
   3. Which points in the plane will satisfy the equation
8. For each value of specified in parts (a)–(e), plot the set of points in the plane that satisfy the equation .
   1. Describe what happens to the graph of as .
9. For each value of specified in parts (a)–(e), plot the set of points in the plane that satisfy the equation .
   1. Describe what happens to the graph of as .