

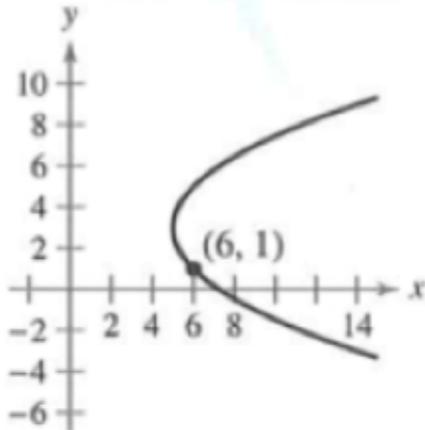
The deadline for all homework assignments is the one specified in Archie before 11:59 pm. As discussed in class, It must be correctly uploaded in order to be graded. Show all your work and justifications.

There are 21 exercises in 4 pages in this assignment:

**Famous Curves** In Exercises **1-18**, find an equation of the tangent line to the graph at the given point. To print an enlarged copy of the graph, go to the website [www.mathgraphs.com](http://www.mathgraphs.com).

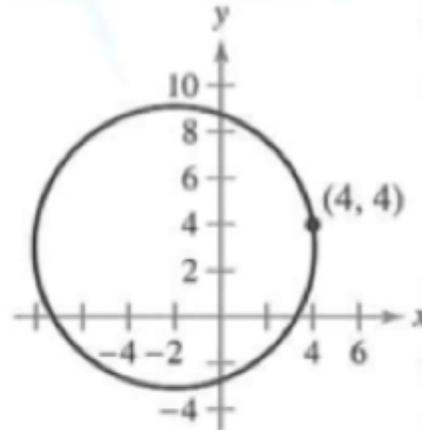
**1 . Parabola**

$$(y - 3)^2 = 4(x - 5)$$



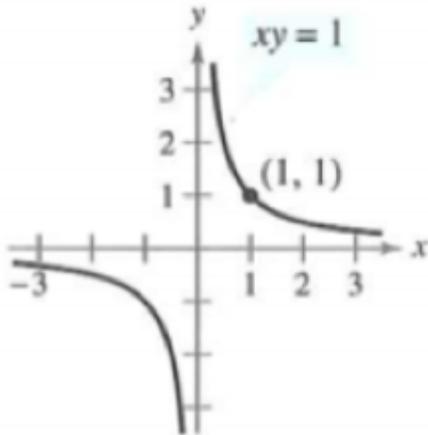
**2 . Circle**

$$(x + 2)^2 + (y - 3)^2 = 37$$



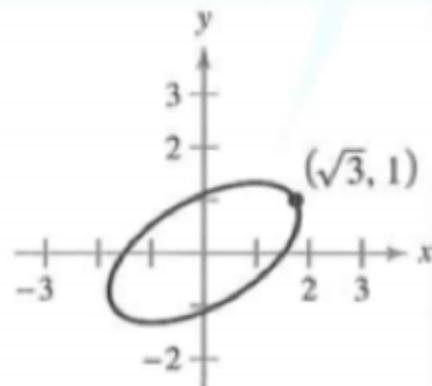
**3 . Rotated hyperbola**

$$xy = 1$$



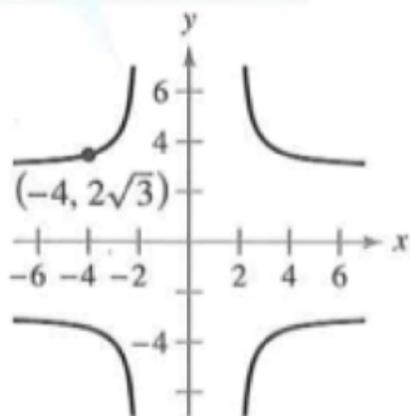
**4 . Rotated ellipse**

$$7x^2 - 6\sqrt{3}xy + 13y^2 - 16 = 0$$



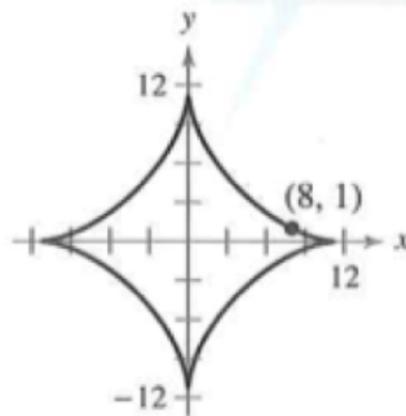
5. Cruciform

$$x^2y^2 - 9x^2 - 4y^2 = 0$$

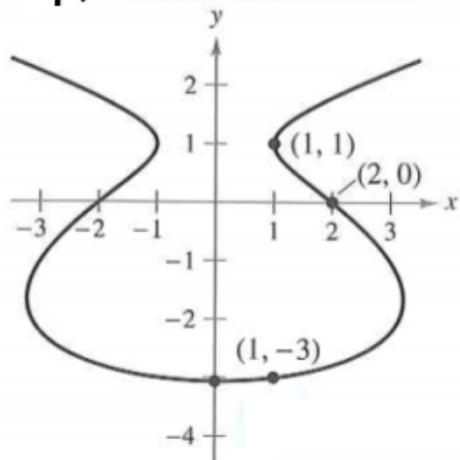


6. Astroid

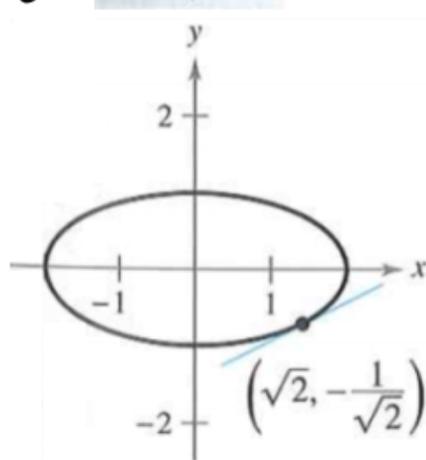
$$x^{2/3} + y^{2/3} = 5$$



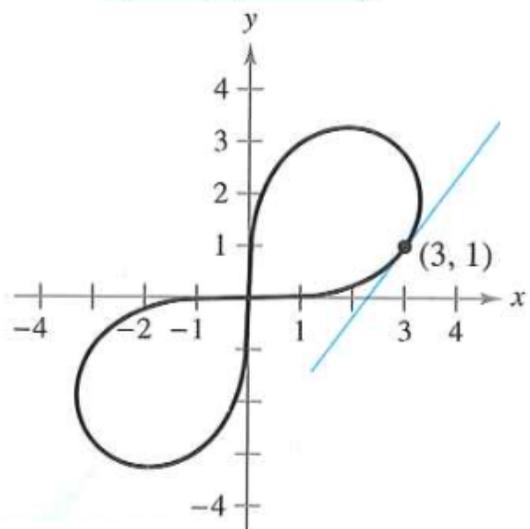
7.  $y^3 + y^2 - 5y - x^2 = -4$



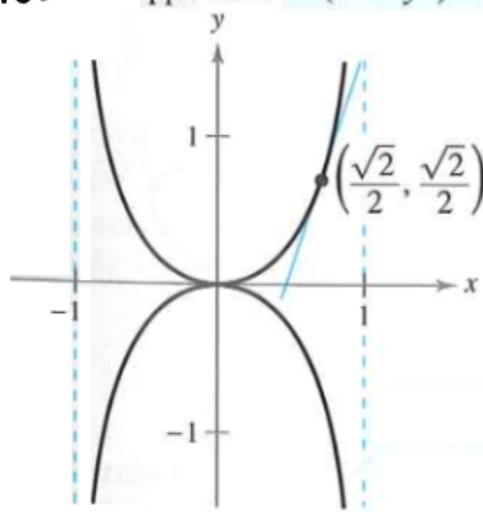
8.  $x^2 + 4y^2 = 4$



9.  $3(x^2 + y^2)^2 = 100xy$



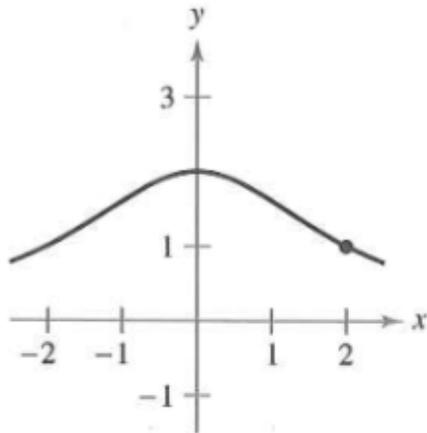
10. The kappa curve  $x^2(x^2 + y^2) = y^2$



**11.** Witch of Agnesi:

$$(x^2 + 4)y = 8$$

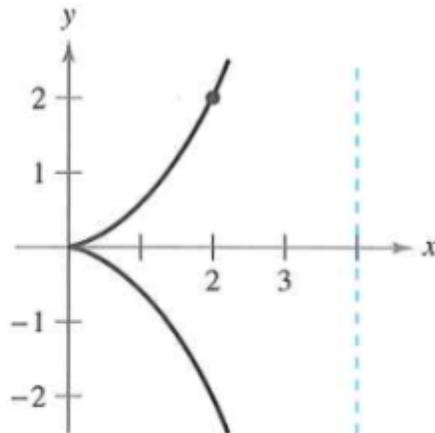
Point: (2, 1)



**12.** Cissoid:

$$(4 - x)y^2 = x^3$$

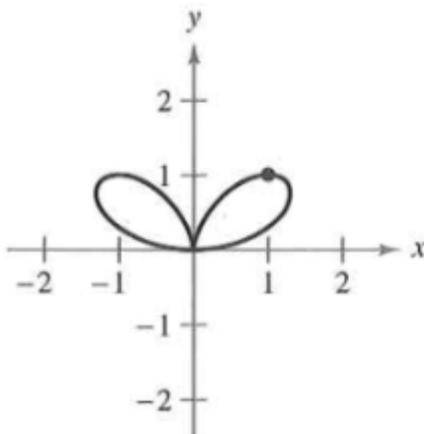
Point: (2, 2)



**13.** Bifolium:

$$(x^2 + y^2)^2 = 4x^2y$$

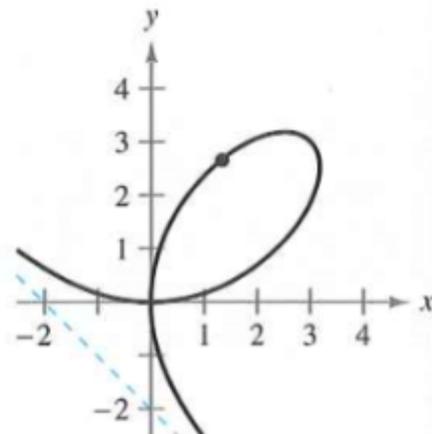
Point: (1, 1)



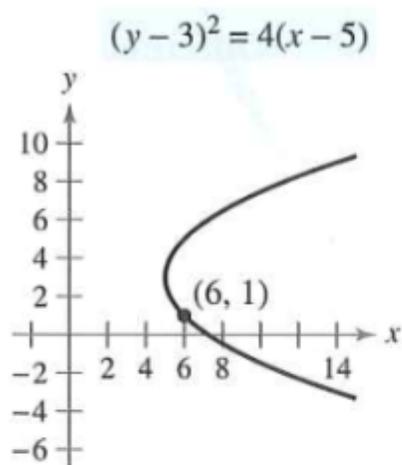
**14.** Folium of Descartes:

$$x^3 + y^3 - 6xy = 0$$

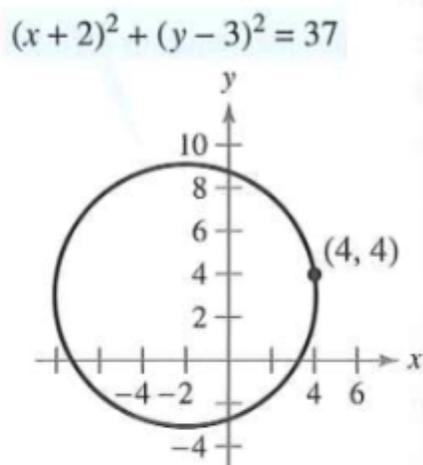
Point:  $(\frac{4}{3}, \frac{8}{3})$



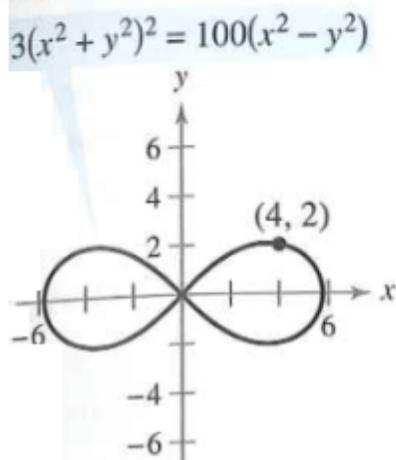
15. Parabola



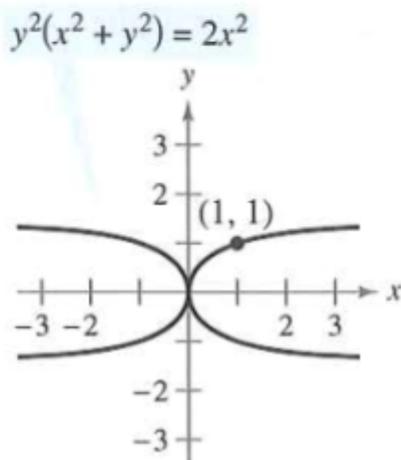
16. Circle



17. Lemniscate



18. Kappa curve



19. **Slope** Find all points on the circle  $x^2 + y^2 = 100$  where the slope is  $\frac{3}{4}$ .

20. **Horizontal Tangent** Determine the point(s) at which the graph of  $y^4 = y^2 - x^2$  has a horizontal tangent.

21. **Tangent Lines** Find equations of both tangent lines to the ellipse  $\frac{x^2}{4} + \frac{y^2}{9} = 1$  that passes through the point (4, 0).