

Tutorial 4 (week 4)

Exercise 10.1

In Exercise 1-8, match the equation with one of the conic sections labelled (a)-(h). If the conic is a parabola, find its vertex, focus and directrix. If it is an ellipse or a hyperbola, find its vertices, foci and eccentricity.

5. $\frac{x^2}{9} + \frac{y^2}{4} = 1$

6. $x^2 + \frac{y^2}{4} = 1$

In Exercise 15-20, find the foci and vertices of the ellipse, and sketch its graph.

15. $\frac{x^2}{4} + \frac{y^2}{25} = 1$

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

In Exercise 31-38, find an equation of the ellipse that satisfies the given conditions.

31. Foci ($\pm 1, 0$), vertices ($\pm 3, 0$)

33. Foci ($0, \pm 1$), length of major axis 6

35. Vertices ($\pm 3, 0$), passing through ($1, \sqrt{2}$)

37. Passes through ($2, \frac{3\sqrt{3}}{2}$) with vertices at ($0, \pm 5$)

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

8. $y^2 - \frac{x^2}{4} = 1$

In Exercise 21-26, find the vertices, foci, and asymptotes of the hyperbola, and sketch its graph using its asymptotes as an aid.

21. $\frac{x^2}{25} - \frac{y^2}{144} = 1$

25. $y^2 - 5x^2 = 25$

In Exercise 39-44, find an equation of the hyperbola centred at the origin that satisfies the given conditions.

39. Foci ($\pm 5, 0$), vertices ($\pm 3, 0$)

41. Foci ($0, \pm 5$), conjugate axis of length 4

43. Vertices ($\pm 2, 0$), asymptotes $y = \pm \frac{3}{2}x$