

Eccentricity of Conic Sections

Identify the eccentricity of each.

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

Eccentricity: $\frac{5}{4} = 1.25$

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

Eccentricity: $\frac{\sqrt{21}}{5} \approx 0.917$

3) $x = 2y^2$

Eccentricity: 1

4) $\frac{x^2}{15} + \frac{y^2}{45} = 1$

Eccentricity: $\frac{\sqrt{6}}{3} \approx 0.816$

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

Eccentricity: $\frac{\sqrt{17}}{4} \approx 1.031$

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

Eccentricity: 0

7) $\frac{(x+2)^2}{4} + \frac{(y+2)^2}{16} = 1$

Eccentricity: $\frac{\sqrt{3}}{2} \approx 0.866$

8) $\frac{(x+1)^2}{4} - \frac{(y+2)^2}{9} = 1$

Eccentricity: $\frac{\sqrt{13}}{2} \approx 1.803$

9) $(x-4)^2 + (y-2)^2 = 1$

Eccentricity: 0

10) $y = (x-6)^2 + 3$

Eccentricity: 1

11) $\frac{(y+1)^2}{16} - \frac{x^2}{25} = 1$

Eccentricity: $\frac{\sqrt{41}}{4} \approx 1.601$

12) $\frac{x^2}{49} + (y+3)^2 = 1$

Eccentricity: $\frac{4\sqrt{3}}{7} \approx 0.99$

13) $x^2 - 9y^2 - 9 = 0$

Eccentricity: $\frac{\sqrt{10}}{3} \approx 1.054$

14) $25x^2 + 16y^2 - 400 = 0$

Eccentricity: $\frac{3}{5} = 0.6$

15) $x^2 + y^2 + 4x + 8y + 11 = 0$

Eccentricity: 0

16) $4x^2 + 9y^2 - 16x - 36y + 16 = 0$

Eccentricity: $\frac{\sqrt{5}}{3} \approx 0.745$

Use the information provided to write the standard form equation of each hyperbola.

17) Vertices: (11, 8), (5, 8)

$$\text{Eccentricity} = \frac{\sqrt{178}}{3}$$

$$\frac{(x-8)^2}{9} - \frac{(y-8)^2}{169} = 1$$

18) Foci: (19, -3), (-7, -3)

$$\text{Eccentricity} = \frac{13}{5}$$

$$\frac{(x-6)^2}{25} - \frac{(y+3)^2}{144} = 1$$

19) Center at (9, 3)

Vertex at (14, 3)

$$\text{Eccentricity} = \frac{\sqrt{61}}{5}$$

$$\frac{(x-9)^2}{25} - \frac{(y-3)^2}{36} = 1$$

20) Center at $\left(-\frac{3}{2}, 8\right)$

Focus at $\left(-\frac{3}{2}, 8 + \sqrt{185}\right)$

$$\text{Eccentricity} = \frac{\sqrt{185}}{8}$$

$$\frac{(y-8)^2}{64} - \frac{\left(x+\frac{3}{2}\right)^2}{121} = 1$$

Use the information provided to write the standard form equation of each ellipse.

21) Eccentricity = $\frac{5}{13}$

Vertices: (3, 3), (-23, 3)

$$\frac{(x+10)^2}{169} + \frac{(y-3)^2}{144} = 1$$

22) Eccentricity = $\frac{5}{13}$

Foci: (-5, 4), (-5, -6)

$$\frac{(x+5)^2}{144} + \frac{(y+1)^2}{169} = 1$$

23) Eccentricity = $\frac{2\sqrt{14}}{9}$

Co-vertices: (0, -10), (-10, -10)

$$\frac{(x+5)^2}{25} + \frac{(y+10)^2}{81} = 1$$

24) Eccentricity = $\frac{\sqrt{21}}{5}$

Center: (-8, 8)

Vertex: (2, 8)

$$\frac{(x+8)^2}{100} + \frac{(y-8)^2}{16} = 1$$

25) Eccentricity = $\frac{\sqrt{14}}{14}$

Center: (2, -9)

Focus: $(2, -9 - \sqrt{5})$

$$\frac{(x-2)^2}{65} + \frac{(y+9)^2}{70} = 1$$

26) Eccentricity = $\frac{\sqrt{35}}{7}$

Center: (7, -4)

Co-vertex: $(7 + \sqrt{10}, -4)$

$$\frac{(x-7)^2}{10} + \frac{(y+4)^2}{35} = 1$$