

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math 002 - Term 151
Recitation (10.2 and 10.3)

Question 1: Find the center, vertices, foci, and eccentricity of the ellipse given by the equation: $4(x-1)^2 + y^2 = 16$

Answer: center = (1,0) Foci = $(1, \pm 2\sqrt{3})$ vertices = $(1, \pm 4)$ e = eccentricity = $\frac{\sqrt{3}}{2}$

Question 2

- a) Find the equation in the standard form of the ellipse that has vertices at (5, 6) and (5, -4) and foci at (5, 4) and (5, -2).
- b) Find the equation in the standard form of the ellipse with foci at (-1, 2) and (3, 2) that passes through the point (3, 5).

Answer: (a): $\boxed{\frac{(x-5)^2}{16} + \frac{(y-1)^2}{25} = 1}$ **(b):** $\boxed{\frac{(x-1)^2}{16} + \frac{(y-2)^2}{12} = 1}$

Question 3 Find the center, vertices, foci, eccentricity, and asymptotes of the hyperbola given by the equation $4x^2 - 16x - 9y^2 = -4$.

Answer: center = (2,0) vertices = $(2 + \sqrt{3}, 0)$, $(2 - \sqrt{3}, 0)$

focus = $\left(2 - \frac{\sqrt{39}}{3}, 0\right)$, $\left(2 + \frac{\sqrt{39}}{3}, 0\right)$ eccentricity = $\frac{\sqrt{13}}{3}$

Asymptotes: $\boxed{y = \frac{2}{3}x - \frac{4}{3}}$, $\boxed{y = -\frac{2}{3}x + \frac{4}{3}}$

Question 4

- a) Find the equation in the standard form of the hyperbola with vertices (2, 3) and (-2, 3), and eccentricity $\frac{5}{2}$.
- b) Find the equation in the standard form of the hyperbola with foci (0, 5) and (0, -5), and asymptotes $y = \pm 2x$.

Answer: (a): $\boxed{\frac{x^2}{4} - \frac{(y-3)^2}{21} = 1}$ **(b):** $\boxed{\frac{y^2}{20} - \frac{x^2}{5} = 1}$

Question 5

The equation of one of the asymptotes of the hyperbola $4(x-1)^2 - (y+1)^2 - 16 = 0$

- A) $y = 2x + 7$ **B) $y = 2x - 3$** C) $y = 2x - 8$
 D) $y = x - 4$ E) $y = 2x + 6$