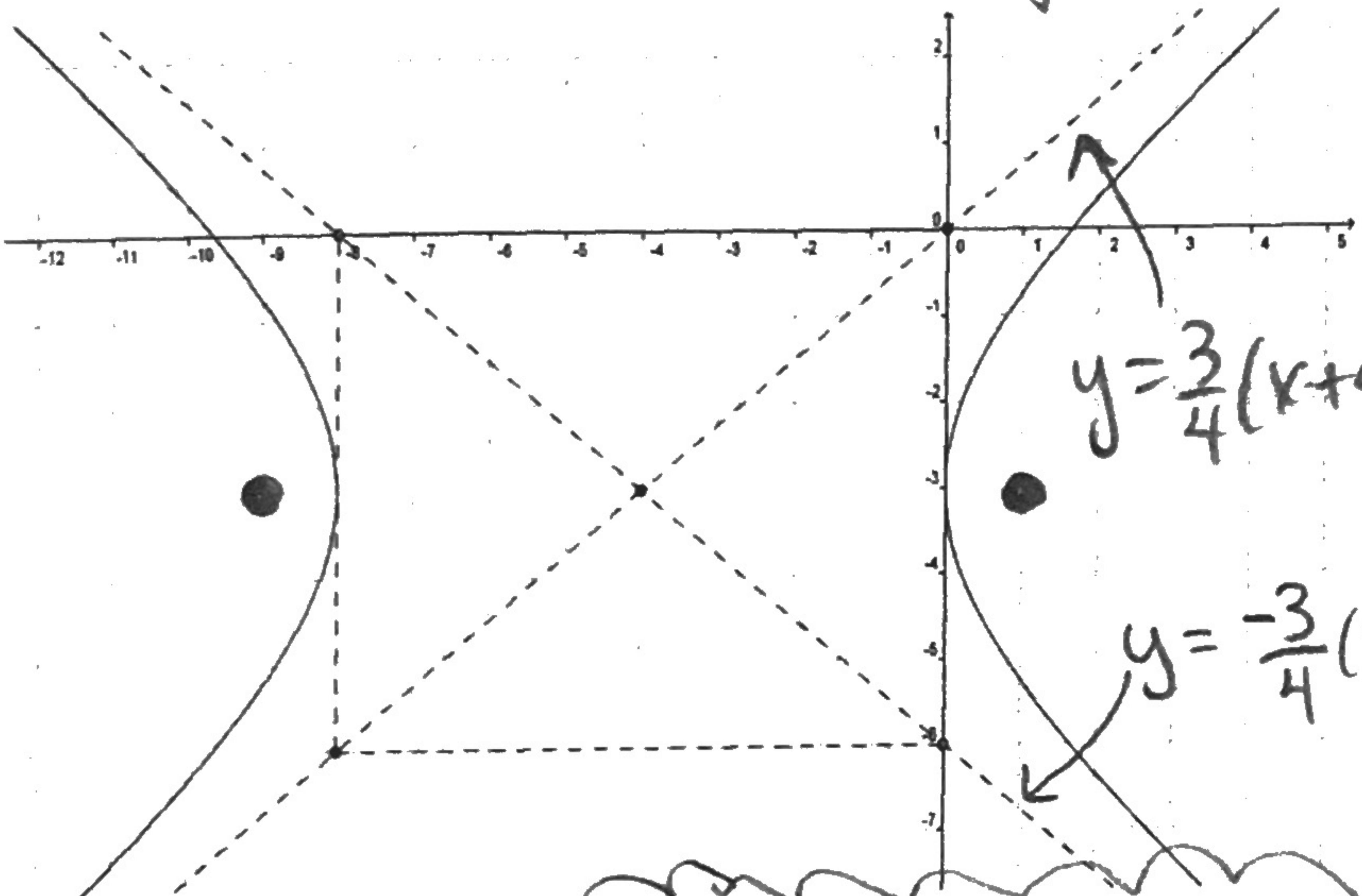


10D Equations of Hyperbolas

Practice Skills Check / Review

Write the equation of the graphs below. Also plot and provide the coordinates of the foci.

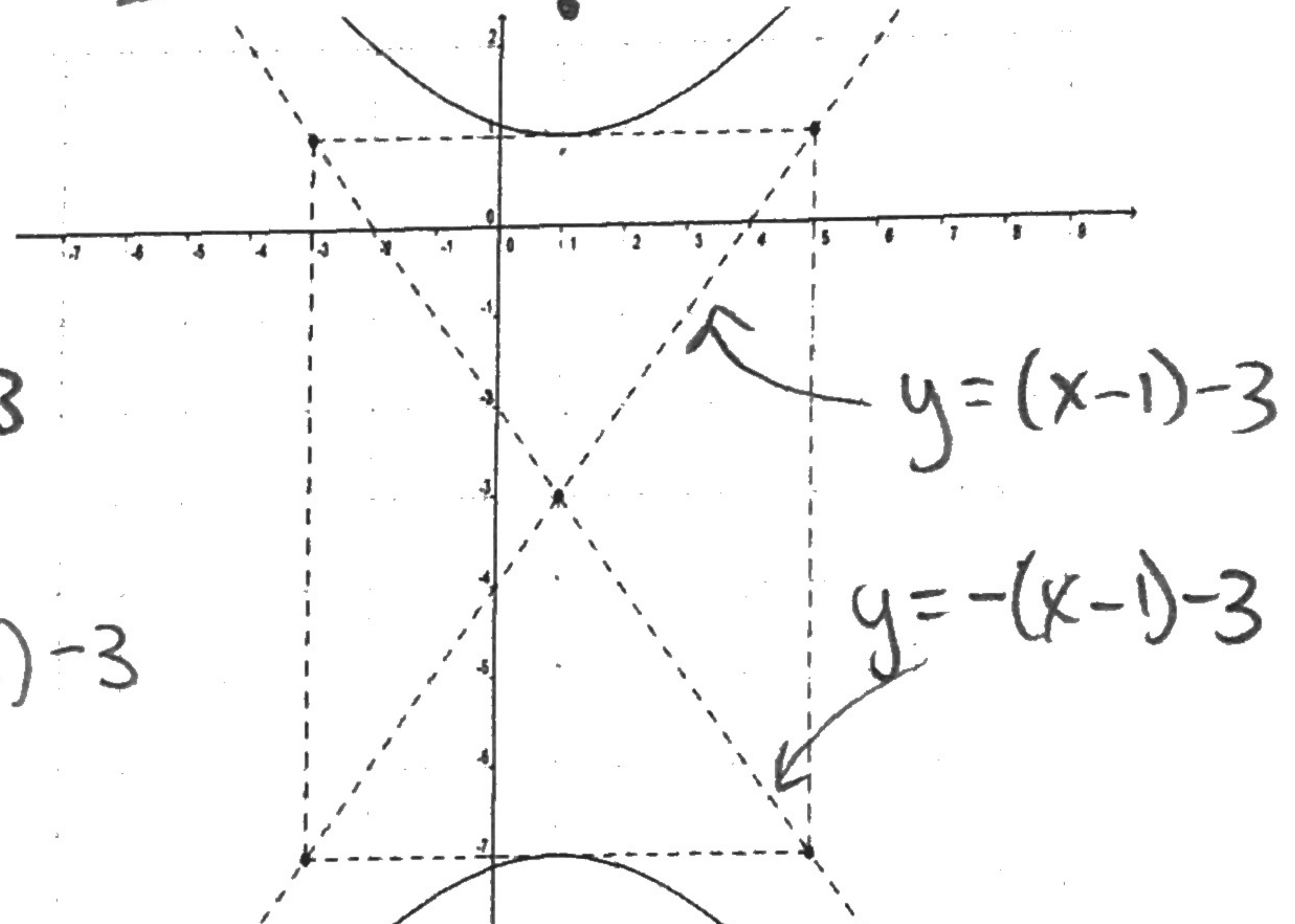
1.
$$\frac{(x+4)^2}{16} - \frac{(y+3)^2}{9} = 1$$



$a^2 + b^2 = c^2$
 $c^2 = 25$
 $c = 5$

Foci $(-9, -3), (1, -3)$

2.
$$\frac{(y+3)^2}{16} - \frac{(x-1)^2}{16} = 1$$



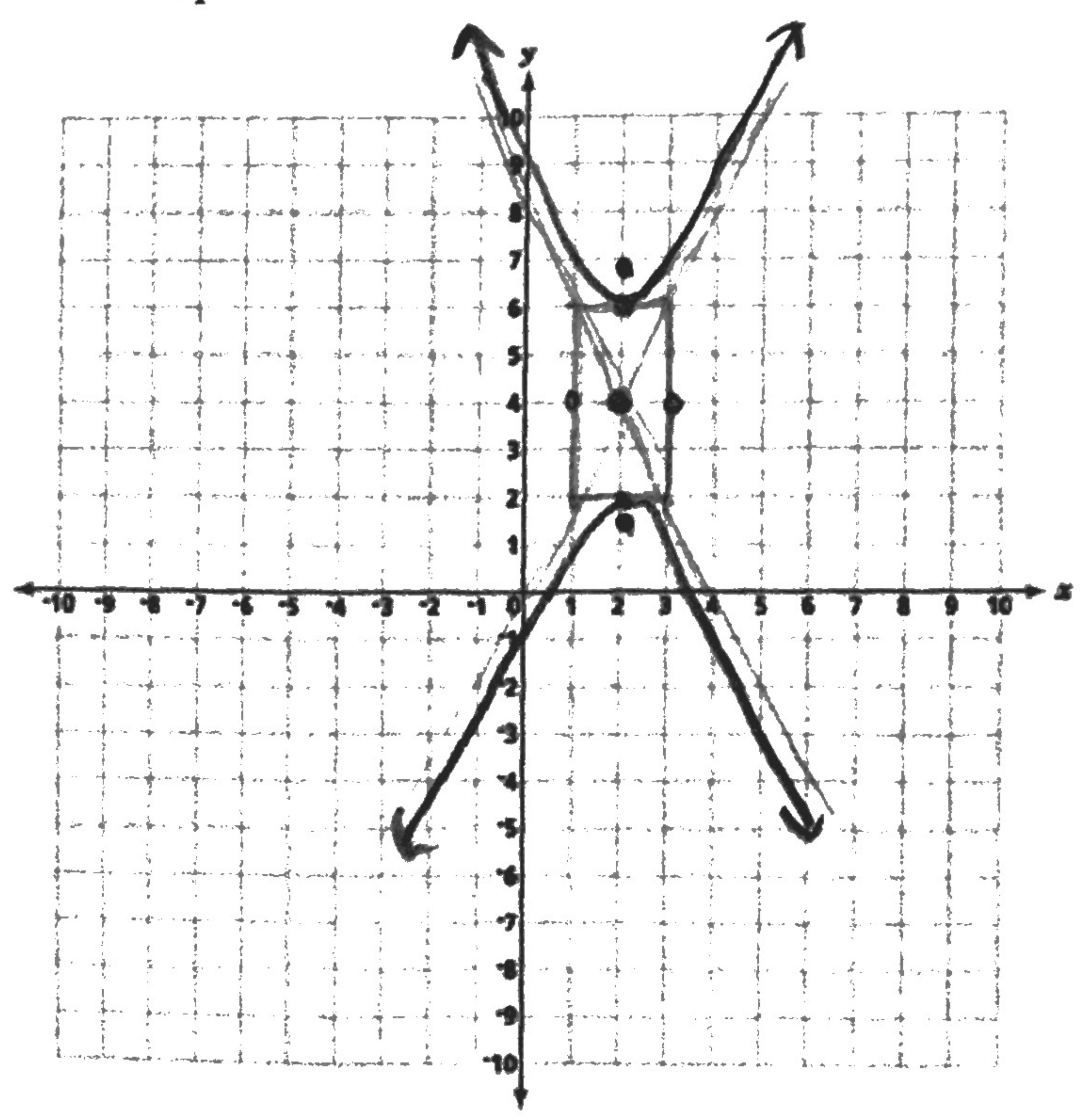
$a^2 + b^2 = c^2$
 $c^2 = 32$
 $c = \sqrt{32} = 4\sqrt{2}$

Foci:
 $(1, -3 - 4\sqrt{2})$
 $(1, -3 + 4\sqrt{2})$

3.
$$\frac{(y-4)^2}{4} - (x-2)^2 = 1$$

Graph below and provide all critical info:

$a = 2$ $b = 1$
 $a^2 + b^2 = c^2$ $c = \sqrt{5}$



Center: $(2, 4)$

Vertices: $(2, 2)$ $(2, 6)$

Covertices: $(1, 4)$ $(3, 4)$

Foci: $(2, 4 \pm \sqrt{5})$

Domain: $x \in \mathbb{R}$

Range: $y \in (-\infty, 2] \cup [6, \infty)$

Equations of Asymptotes (in point-slope form):

$y = 2(x-2) + 4$
 $y = -2(x-2) + 4$ or $y = \pm 2(x-2) + 4$

- (E) Equation (A) Asymptotes
 (C) Center (V) Vertices (CV) Covertices (F) Foci (D) Domain (R) Range

Use the information provided to write the equation of the hyperbola. Provide any critical info that is not given: Center, Vertices, Covertices, Foci, Domain, Range, Equations of Asymptotes (in point-slope form). Simplify/rationalize all fractions & radicals. No calculator.

4. Center: (2,1), Vertical Transverse Axis length: 14, Conjugate Axis length: 26.

(E) $\frac{(y-1)^2}{49} - \frac{(x-2)^2}{169} = 1$ (A) $y = \pm \frac{7}{13}(x-2) + 1$
 (F) $(2, 1 - \sqrt{218})(2, 1 + \sqrt{218})$
 (V) $(2, -6)(2, 8)$ (D) $x \in \mathbb{R}$
 (CV) $(-11, 1)(15, 1)$ (R) $y \leq -6$ or $y \geq 8$

5. Domain: $x \in (-\infty, -10] \cup [-4, \infty)$. Transverse Axis: $y = -1$, length: 6, Conjugate Axis of length 14.

(R) $y \in \mathbb{R}$ (C) $(-7, -1)$ (A) $y = \pm \frac{7}{3}(x+7) - 1$
 (V) $(-10, 1)(-4, -1)$
 (CV) $(-7, 6)(-7, -8)$
 (F) $(-7 \pm \sqrt{58}, -1)$

6. Foci: (-5,2) and (5,2), Transverse Axis length: 4.

$a=2$ (C) $(0, 2)$ (E) $\frac{x^2}{4} - \frac{(y-2)^2}{21} = 1$
 $c=5$ (V) $(-2, 2)(2, 2)$
 $b=\sqrt{21}$ (CV) $(0, 2 \pm \sqrt{21})$
 (A) $y = \pm \frac{\sqrt{21}}{2}x - 2$ (D) $x \leq -2$ or $x \geq 2$
 (R) $y \in \mathbb{R}$

7. Vertices: (6,-5) and (2,-5), Covertices: (4,-1) and (4,-9).

(C) $(4, -5)$ (E) $\frac{(x-4)^2}{4} - \frac{(y+5)^2}{16} = 1$
 (F) $(4 \pm 2\sqrt{5}, -5)$
 (D) $x \leq 2$ or $x \geq 6$
 (R) $y \in \mathbb{R}$ (A) $y = \pm 2(x-4) - 5$

8. Vertices at (2,-3) and (2,11), Foci: (2,-5) and (2,13)

(D) $x \in \mathbb{R}$ (CV) $(2 \pm 4\sqrt{2}, 4)$
 (R) $y \leq -3$ or $y \geq 11$ (E) $\frac{(y-4)^2}{49} - \frac{(x-2)^2}{32} = 1$
 (C) $(2, 4)$
 (A) $y = \pm \frac{7\sqrt{2}}{8}(x-2) + 4$

9. Equations of Asymptotes One vertex: (-3, -3) $a=4$ slope = $\frac{b}{a} = 1$ $\frac{b}{4} = 1$ $b=4$

$y = -x - 2$ (C) $(1, -3)$ (E) $\frac{(x-1)^2}{16} - \frac{(y+3)^2}{16} = 1$
 $y = x - 4$ (V) $(-3, -3)(5, -3)$
 $-x - 2 = x - 4$ (CV) $(1, 1)(1, -7)$
 $2 = 2x$ (D) $x \leq -3$ or $x \geq 5$
 $x = 1$ (R) $y \in \mathbb{R}$ (A) $y = \pm(x-1) - 3$
 $y = 1 - 4$
 $y = -3$