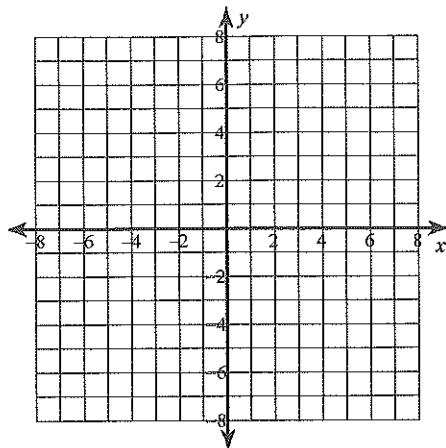


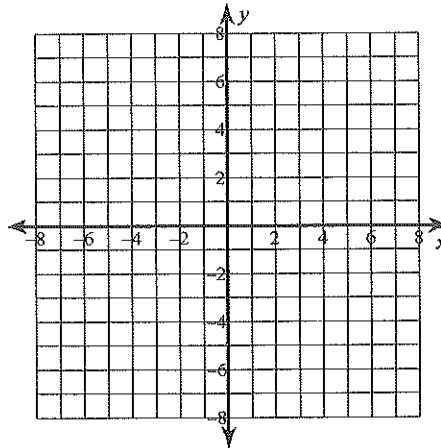
Hyperbolas: Day 1

Identify the vertices, foci, asymptotes, and direction of opening of each. Then sketch the graph.

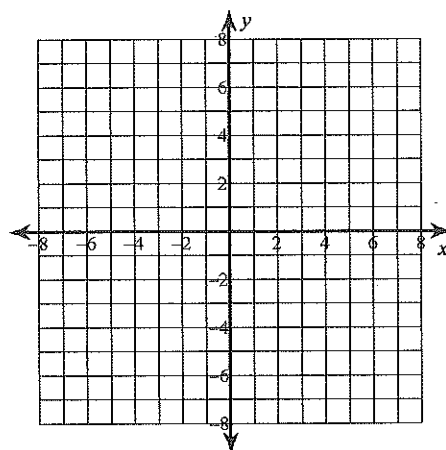
1) $\frac{(y-2)^2}{9} - (x-3)^2 = 1$



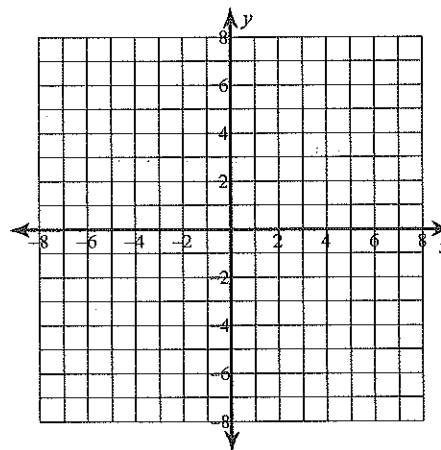
2) $\frac{y^2}{25} - \frac{x^2}{25} = 1$



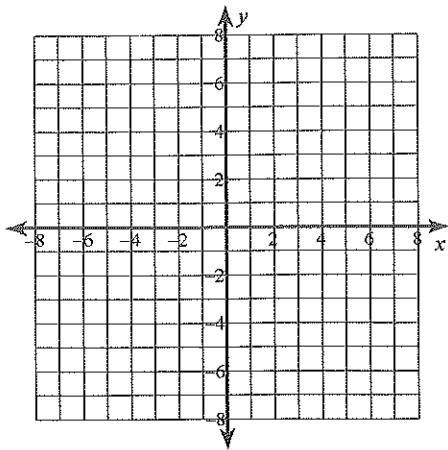
3) $x^2 - \frac{y^2}{16} = 1$



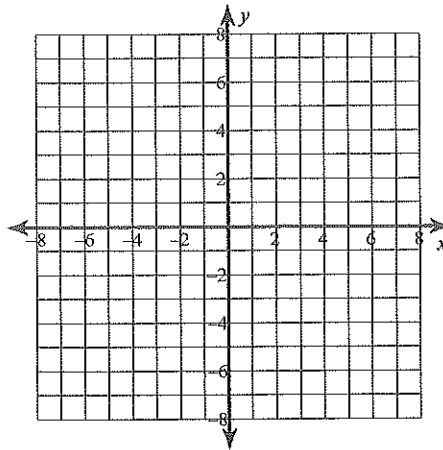
4) $\frac{x^2}{25} - \frac{y^2}{16} = 1$



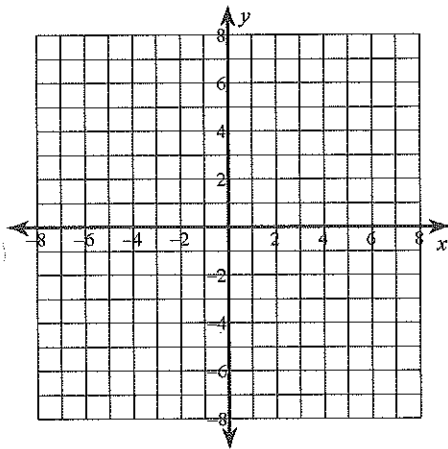
$$5) -16x^2 + 25y^2 + 50y - 375 = 0$$



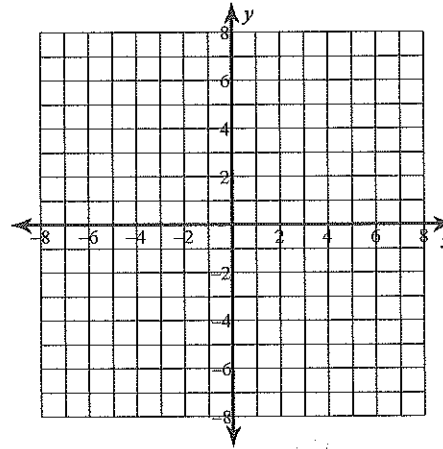
$$6) -9x^2 + y^2 + 9x + 3y - 9 = 0$$



$$7) 9x^2 - 4y^2 + 36x - 8y - 4 = 0$$

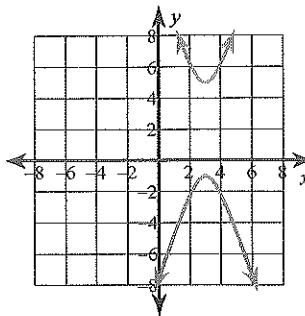


$$8) 9x^2 - y^2 + 18x = 0$$



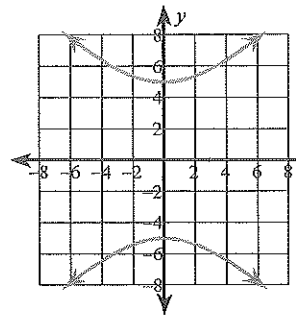
Answers to Hyperbolas: Day 1 (ID: 1)

1)



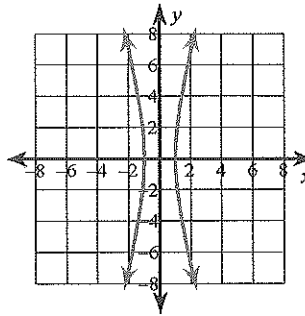
Vertices: $(3, 5)$
 $(3, -1)$
 Foci: $(3, 2 + \sqrt{10})$
 $(3, 2 - \sqrt{10})$
 Asym.: $y = 3x - 7$
 $y = -3x + 11$
 Opens up/down

2)



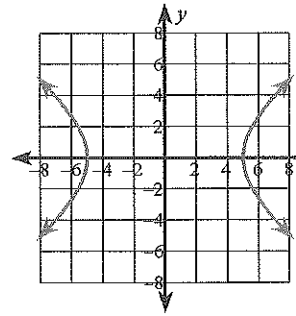
Vertices: $(0, 5)$
 $(0, -5)$
 Foci: $(0, 5\sqrt{2})$
 $(0, -5\sqrt{2})$
 Asym.: $y = x$
 $y = -x$
 Opens up/down

3)



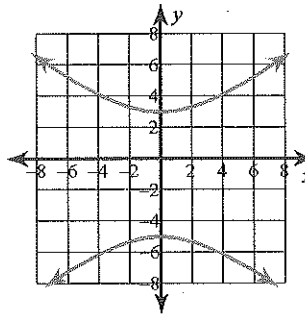
Vertices: $(1, 0)$
 $(-1, 0)$
 Foci: $(\sqrt{17}, 0)$
 $(-\sqrt{17}, 0)$
 Asym.: $y = 4x$
 $y = -4x$
 Opens left/right

4)



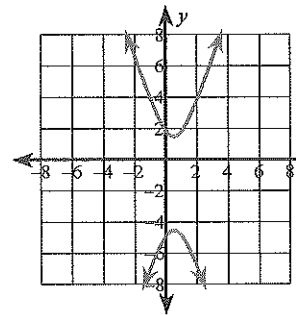
Vertices: $(5, 0)$
 $(-5, 0)$
 Foci: $(\sqrt{41}, 0)$
 $(-\sqrt{41}, 0)$
 Asym.: $y = \frac{4}{5}x$
 $y = -\frac{4}{5}x$
 Opens left/right

5)



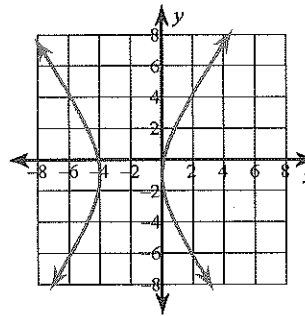
Vertices: $(0, 3)$
 $(0, -5)$
 Foci: $(0, -1 + \sqrt{41})$
 $(0, -1 - \sqrt{41})$
 Asym.: $y = \frac{4}{5}x - 1$
 $y = -\frac{4}{5}x - 1$
 Opens up/down

6)



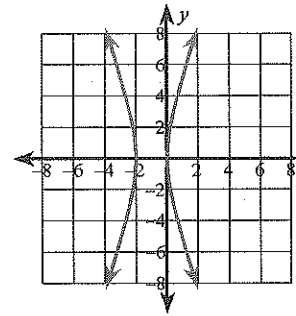
Vertices: $(\frac{1}{2}, \frac{3}{2})$
 $(\frac{1}{2}, -\frac{9}{2})$
 Foci: $(\frac{1}{2}, \frac{2\sqrt{10}-3}{2})$
 $(\frac{1}{2}, \frac{-2\sqrt{10}-3}{2})$
 Asym.: $y = 3x - 3$
 $y = -3x$
 Opens up/down

7)



Vertices: $(0, -1)$
 $(-4, -1)$
 Foci: $(-2 + \sqrt{13}, -1)$
 $(-2 - \sqrt{13}, -1)$
 Asym.: $y = \frac{3}{2}x + 2$
 $y = -\frac{3}{2}x - 4$
 Opens left/right

8)



Vertices: $(0, 0)$
 $(-2, 0)$
 Foci: $(-1 + \sqrt{10}, 0)$
 $(-1 - \sqrt{10}, 0)$
 Asym.: $y = 3x + 3$
 $y = -3x - 3$
 Opens left/right