

# Answers For Hyperbolas in Standard Form

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Algebra 2

#	Problem	Direction	Center	a	b	c same direction as "a"	Vertices	Foci	Eccentricity $e = c/a$
1	$x^2/4 - y^2/9=1$	Horiz	(0,0)	2 (left & right)	3 (up & down)	$\sqrt{13} = 3.6$	(2,0) (-2,0)	(-3.6, 0) (3.6, 0)	$\frac{\sqrt{13}}{2}$
2	$(x+1)^2/16 - (y+2)^2/9=1$	Horiz	(-1,-2)	4 (left & right)	3 (up & down)	5	(-5,-2) (3,-2)	(-6, -2) (4, -2)	$\frac{5}{4}$
3	$(x-3)^2/16 - (y+4)^2/25=1$	Horiz	(3,-4)	4 (left & right)	5 (up & down)	$\sqrt{41} = 6.4$	(-1,-4) (7, -4)	(-3.4, -4) (9.4, -4)	$\frac{\sqrt{41}}{4}$
4	$(x-2)^2/36 - (y+2)^2/16=1$	Horiz	(2,-2)	6 (left & right)	4 (up & down)	$2\sqrt{13} = 7.2$	(-4,-2) (8,-2)	(-5.2, -2) (9.2, -2)	$\frac{\sqrt{13}}{3}$
5	$y^2/4 - x^2/9 = 1$	Vert	(0,0)	2 (up & down)	3 (left & right)	$\sqrt{13} = 3.6$	(0,2) (0,-2)	(0, 3.6) (0, -3.6)	$\frac{\sqrt{13}}{2}$
6	$(y-1)^2/9 - (x-2)^2/4 = 1$	Vert	(2,1)	3 (up & down)	2 (left & right)	$\sqrt{13} = 3.6$	(2, 4) (2,-2)	(2, 4.6) (2, -2.6)	$\frac{\sqrt{13}}{3}$
7	$(y+2)^2/16 - (x+3)^2/25=1$	Vert	(-3,-2)	4 (up & down)	5 (left & right)	$\sqrt{41} = 6.4$	(-3, 2) (-3,-6)	(-3, 4.4) (-3, -8.4)	$\frac{\sqrt{41}}{4}$
8	$(y-3)^2/36 - (x-4)^2/25=1$	Vert	(4,3)	6 (up & down)	5 (left & right)	$\sqrt{61} = 7.8$	(4,9) (4,-3)	(4, 10.8) (4, -4.8)	$\frac{\sqrt{61}}{6}$

**Horiz = Horizontal**

**Vert = Vertical**

**Answers for Hyperbolas in General Form are on the next page.**

## Answers For Hyperbolas in General Form

#	General Form	Standard Form	Direction	Center	a Same direction as hyperbola	b opposite direction from "a"	c same direction as "a"	Vertices	Foci	Eccentricity $e = c/a$
1	$9x^2 - 4y^2 + 18x - 16y - 43 = 0$	$\frac{(x+1)^2}{4} - \frac{(y+2)^2}{9} = 1$	Horiz	(-1, -2)	2	3	$\sqrt{13} = 3.6$	(-3, -2) (1, -2)	(-4.6, -2) (2.6, -2)	$\frac{\sqrt{13}}{2}$
2	$4x^2 - 25y^2 - 100 = 0$	$\frac{x^2}{25} - \frac{y^2}{4} = 1$	Horiz	(0, 0)	5	2	$\sqrt{29} = 5.4$	(-5, 0) (5, 0)	(-5.4, 0) (5.4, 0)	$\frac{\sqrt{29}}{5}$
3	$4x^2 - y^2 - 24x + 4y + 16 = 0$	$\frac{(x-3)^2}{4} - \frac{(y-2)^2}{16} = 1$	Horiz	(3, 2)	2	4	$2\sqrt{5} = 4.5$	(1, 2) (5, 2)	(-1.5, 2) (7.5, 2)	$\frac{\sqrt{5}}{1}$
4	$x^2 - 9y^2 + 4x + 18y = 14$	$\frac{(x+2)^2}{9} - \frac{(y-1)^2}{1} = 1$	Horiz	(-2, 1)	3	1	$\sqrt{10} = 3.2$	(-5, 1) (1, 1)	(-5.2, 1) (1.2, 1)	$\frac{\sqrt{10}}{3}$
5	$4x^2 - y^2 + 12x - 4y + 1 = 0$	$\frac{\left(x + \frac{3}{2}\right)^2}{1} - \frac{(y+2)^2}{4} = 1$	Horiz	(-1.5, -2)	1	2	$\sqrt{5} = 2.2$	(-2.5, -2) (-0.5, -2)	(-3.7, -2) (0.7, -2)	$\frac{\sqrt{5}}{1}$
6	$2x^2 - 8y^2 + 8x - 24y - 18 = 0$	$\frac{(x+2)^2}{4} - \frac{\left(y + \frac{3}{2}\right)^2}{1} = 1$	Horiz	(-2, -1.5)	2	1	$\sqrt{5} = 2.2$	(-4, -1.5) (0, -1.5)	(-4.2, -1.5) (0.2, -1.5)	$\frac{\sqrt{5}}{2}$
7	$8x^2 - 2y^2 + 32x - 6y + 19\frac{1}{2} = 0$	$\frac{(x+2)^2}{1} - \frac{\left(y + \frac{3}{2}\right)^2}{4} = 1$	Horiz	(-2, -1.5)	1	2	$\sqrt{5} = 2.2$	(-3, -1.5) (-1, -1.5)	(-4.2, -1.5) (0.2, -1.5)	$\frac{\sqrt{5}}{1}$
8	$x^2 - 4y^2 - 2x - 8y - 7 = 0$	$\frac{(x-1)^2}{4} - \frac{(y+1)^2}{1} = 1$	Horiz	(1, -1)	2	1	$\sqrt{5} = 2.2$	(-1, -1) (3, -1)	(-1.2, -1) (3.2, -1)	$\frac{\sqrt{5}}{2}$
9	$9x^2 - 4y^2 + 36x - 24y - 36 = 0$	$\frac{(x+2)^2}{4} - \frac{(y+3)^2}{9} = 1$	Horiz	(-2, -3)	2	3	$\sqrt{13} = 3.6$	(-4, -3) (0, -3)	(-5.6, -3) (1.6, -3)	$\frac{\sqrt{13}}{2}$

**Horiz = Horizontal**

**Vert = Vertical**