

Answers For Conic Sections in Standard Form

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Algebra 2

Parabolas

#	Problem	Opening	Width	Vertex	Axis	Focus	Directrix	Points
1	$y = 2(x-3)^2 + 4$	Up	Narrow	(3,4)	$x = 3$	(3, 4 1/8)	$y = 3 \frac{7}{8}$	(4,6) (5,12) (6,22)
2	$y = \frac{1}{2}(x+1)^2 - 2$	Up	Wide	(-1,-2)	$x = -1$	(-1, -1 1/2)	$y = -2.5$	(0,-1.5) (1,0) (2, 2.5)
3	$y = -4(x-2)^2 + 5$	Down	Narrow	(2,5)	$x = 2$	(2, 4 15/16)	$y = 5 \frac{1}{16}$	(3,1) (4,-11)
4	$y = -\frac{1}{3}(x-3)^2 + 1$	Down	Wide	(3,1)	$x = 3$	(3, 1/4)	$y = 1.75$	(4, 2/3) (5, -1/3) (6,-2)
5	$y = -2(x+1)^2 - 1$	Down	Narrow	(-1,-1)	$x = -1$	(-1, -1/8)	$y = -7/8$	(0, -3) (1, -9) (2, -19)
6	$x = \frac{2}{3}(y-1)^2 + 1$	Right	Wide	(1,1)	$y = 1$	(1 3/8, 1)	$x = 5/8$	(1 2/3, 2) (3 2/3, 3)
7	$x = 4(y-3)^2 - 4$	Right	Narrow	(-4,3)	$y = 3$	(3 7/8, 3)	$x = -4 \frac{1}{8}$	(0,4) (12,5)
8	$x = -2(y+1)^2 + 3$	Left	Narrow	(3, -1)	$y = -1$	(2 7/8, -1)	$x = 3 \frac{1}{8}$	(1,0) (-5,1) (-15,2)
9	$x = -\frac{1}{2}(y-2)^2 - 5$	Left	Wide	(-5,2)	$y = 2$	(-5 1/2, 2)	$x = -4 \frac{1}{2}$	(-5 1/2, 3) (-7,4)
10	$x = 3(y+4)^2 + 3$	Right	Narrow	(3, -4)	$y = -4$	(3 1/12, -4)	$x = 2 \frac{11}{12}$	(15,-2) (-7, 4)

Circles

#	Problem	Center	Radius
1	$x^2 + y^2 = 36$	(0,0)	6
2	$x^2 + (y-3)^2 = 16$	(0,3)	4
3	$(x-2)^2 + y^2 = 25$	(2,0)	5
4	$(x+1)^2 + (y-5)^2 = 49$	(-1,5)	7
5	$(x-3)^2 + (y+2)^2 = 81$	(3,-2)	9
6	$(x+5)^2 + (y-1)^2 = 121$	(-5,1)	11
7	$(x-3/2)^2 + (y+9/2)^2 = 16$	(3/2, -9/2)	4
8	$(x+1)^2 + (y-1)^2 = 12$	(-1,1)	$2\sqrt{3} \doteq 3.4$
9	$(x-3/4)^2 + (y+1/6)^2 = 8$	(3/4, -1/6)	$2\sqrt{2} \doteq 2.8$
10	$(x+10)^2 + (y-5)^2 = 7$	(-10,5)	$\sqrt{7} \doteq 2.6$

Ellipses

#	Problem	Direction	Center	a	b	c same direction as “a”	Vertices	Foci
1	$x^2/16 + y^2/9=1$	Horizontal	(0,0)	4 (left & right)	3 (up & down)	$\sqrt{7} \doteq 2.6$	(4,0) (-4,0) (0,3) (0,-3)	(2.6,0) (-2.6,0)
2	$x^2/25 + (y-3)^2/4=1$	Horizontal	(0,3)	5 (left & right)	2 (up & down)	$\sqrt{21} \doteq 4.6$	(5,3) (-5,3) (0,5) (0,1)	(4.6,3) (-4.6,3)
3	$(x+1)^2/49 + (y+2)^2/25=1$	Horizontal	(-1,-2)	7 (left & right)	5 (up & down)	$2\sqrt{6} \doteq 4.9$	(-8,-2) (6,-2) (-1,3) (-1,-7)	(-5.9,-2) (3.9,-2)
4	$(x-4)^2/12 + (y+3)^2/8=1$	Horizontal	(4,-3)	$2\sqrt{3} \doteq 3.5$ (left & right)	$2\sqrt{2} \doteq 2.8$ (up & down)	2	(7.5,-3) (0.5,-3) (4, 0.2) (4, -5.8)	(6,-3) (2,-3)
5	$x^2/4 + y^2/25=1$	Vertical	(0,0)	5 (up & down)	2 (left & right)	$\sqrt{21} \doteq 4.6$	(2,0) (-2,0) (0,5) (0,-5)	(0,4.6) (0,-4.6)
6	$(x-3)^2/4 + y^2/16=1$	Vertical	(3,0)	4 (up & down)	2 (left & right)	$2\sqrt{3} \doteq 3.5$	(5,0) (1,0) (3,4) (3,-4)	(3, 3.5) (3, -3.5)
7	$(x+4)^2/25 + (y+5)^2/36=1$	Vertical	(-4,-5)	6 (up & down)	5 (left & right)	$\sqrt{11} \doteq 3.3$	(-9,-5) (1,-5) (-4,1) (-4,-11)	(-4, -8.3) (-4,-1.7)
8	$(x-2)^2/4 + (y+3)^2/9=1$	Vertical	(2,-3)	3 (up & down)	2 (left & right)	$\sqrt{5} \doteq 2.2$	(5,-3) (-1,-3) (2,0) (2,-6)	(2, -5.2) (2,-0.8)

Hyperbolas

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