

Answers For Parabolas in Standard Form

#	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	$y = 1/2(x+1)^2 - 2$	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	$y = -1/3(x - 3)^2 + 1$	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 1/8)	$y = -7/8$	(0, -3) (1, -9) (2, -19)
6	$x = 2/3(y - 1)^2 + 1$	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 15/16, 3)	$x = -4 \frac{1}{16}$	(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	$x = -1/2(y - 2)^2 - 5$	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)	$x = 2 \frac{11}{12}$	(6, -3) (15,-2) (30, -1)

The eccentricity for ALL parabolas is 1 (one). $e = 1$

General Form on Next Page

Answers For Parabolas in General Form

#	General Form	Standard Form	Opens	Width	Vertex	Axis	Focus	Directrix	Points
1	$y=x^2+4x-5$	$y = (x + 2)^2 - 9$	Up	Normal	$(-2, -9)$	$x = -2$	$(-2, -8 \frac{3}{4})$	$y = -9 \frac{1}{4}$	$(-1, -8) (0, -5) (1, 0)$
2	$y=x^2+2x-3$	$y = (x + 1)^2 - 4$	Up	Normal	$(-1, -4)$	$x = -1$	$(-1, -3 \frac{3}{4})$	$y = -4 \frac{1}{4}$	$(0, -3) (1, 0) (2, 5)$
3	$y=x^2+4x+4$	$y = (x + 2)^2$	Up	Normal	$(-2, 0)$	$x = -2$	$(-2, 1/4)$	$y = -1/4$	$(-1, 1) (0, 4) (1, 9)$
4	$y=x^2-4$	$y = (x - 0)^2 - 4$	Up	Normal	$(0, -4)$	$x = 0$	$(0, -3 \frac{3}{4})$	$y = -4 \frac{1}{4}$	$(1, -3) (2, 0) (3, 5)$
5	$y=x^2+3x+2$	$y = (x + 1 \frac{1}{2})^2 - 1/4$	Up	Normal	$(-1 \frac{1}{2}, -1/4)$	$x = -1 \frac{1}{2}$	$(-1 \frac{1}{2}, 0)$	$y = -1/2$	$(-1/2, 3/4) (1/2, 3 \frac{3}{4}) (1 \frac{1}{2}, 8 \frac{3}{4})$
6	$y=x^2-5x+4$	$y = (x - 2 \frac{1}{2})^2 - 2 \frac{1}{4}$	Up	Normal	$(2 \frac{1}{2}, -2 \frac{1}{4})$	$x = 2 \frac{1}{2}$	$(2 \frac{1}{2}, -2)$	$y = -2 \frac{1}{2}$	$(3 \frac{1}{2}, -1 \frac{1}{4}) (4 \frac{1}{2}, 1 \frac{3}{4}) (5 \frac{1}{2}, 6 \frac{3}{4})$
7	$y=2x^2-3x-2$	$y = (x - 3/4)^2 - 3 \frac{1}{8}$	Up	Narrow	$(3/4, -3 \frac{1}{8})$	$x = 3/4$	$(3/4, -3)$	$y = -3 \frac{1}{4}$	$(1 \frac{3}{4}, -1 \frac{1}{8}) (2 \frac{3}{4}, 4 \frac{7}{8}) (3 \frac{3}{4}, 14 \frac{7}{8})$
8	$y=\frac{1}{2}x^2+2x-2\frac{1}{2}$	$y = (x + 2)^2 - 4 \frac{1}{2}$	Up	Wide	$(-2, -4 \frac{1}{2})$	$x = -2$	$(-2, -4)$	$y = -5$	$(-1, -4) (0, -2 \frac{1}{2}) (1, 0)$
9	$y=x^2-x+12$	$y = (x - 1/2)^2 + 11 \frac{3}{4}$	Up	Normal	$(1/2, 11 \frac{3}{4})$	$x = 1/2$	$(1/2, 12)$	$y = 11 \frac{1}{2}$	$(1 \frac{1}{2}, 12 \frac{3}{4}) (2 \frac{1}{2}, 15 \frac{3}{4})$
10	$y=2x^2-2$	$y = (x - 0)^2 - 2$	Up	Narrow	$(0, -2)$	$x = 0$	$(0, -1 \frac{7}{8})$	$y = -2 \frac{1}{8}$	$(1, 0) (2, 6) (3, 16)$
11	$x=4y^2+4y+1$	$x = 4(y + 1/2)^2 + 0$	Right	Narrow	$(0, -1/2)$	$y = -1/2$	$(1/16, -1/2)$	$x = -1/16$	$(4, 1/2) (16, 1 \frac{1}{2})$
12	$x=\frac{1}{3}y^2+2y+3$	$x = \frac{1}{3} (y + 3)^2 + 0$	Right	Wide	$(0, -3)$	$y =$	$(3/4, -3)$	$x = -3/4$	$(1/3, -2) (1 \frac{1}{3}, -1) (3, 0)$
13	$x=2y^2+6y+4$	$x = 2(y + 1 \frac{1}{2})^2 - 1/2$	Right	Narrow	$(-1/2, -1 \frac{1}{2})$	$y = -1 \frac{1}{2}$	$(-3/8, -1 \frac{1}{2})$	$x = -5/8$	$(1.5, -0.5) (7.5, 0.5) (17.5, 1.5)$
14	$x=\frac{1}{2}y^2+1\frac{1}{2}y+1$	$x = \frac{1}{2} (y + 1 \frac{1}{2})^2 - 1/8$	Right	Wide	$(-1/8, -1 \frac{1}{2})$	$y = -1 \frac{1}{2}$	$(3/8, -1 \frac{1}{2})$	$x = -5/8$	$(3/8, -1/2) (1 \frac{7}{8}, 1/2) (4 \frac{3}{8}, 1 \frac{1}{2})$
15	$x=\frac{1}{2}y^2+y+\frac{1}{2}$	$x = \frac{1}{2} (y + 1)^2 + 0$	Right	Wide	$(0, -1)$	$y = -1$	$(0.5, -1)$	$x = -1/2$	$(1/2, 0) (2, 1) (4.5, 2)$
16	$x=4y^2-1$	$x = 4(y - 0)^2 - 1$	Right	Narrow	$(-1, 0)$	$y = 0$	$(-15/16, 0)$	$x = -1 \frac{1}{16}$	$(3, 1) (15, 2) (35, 3)$
17	$x=2y^2+3y+1$	$x = 2(y + 3/4)^2 - 1/8$	Right	Narrow	$(-1/8, -3/4)$	$y = -3/4$	$(-1/8, -3/4)$	$x = -1/4$	$(1 \frac{7}{8}, 1/4) (7 \frac{7}{8}, 1 \frac{1}{4}) (17 \frac{7}{8}, 2 \frac{1}{4})$
18	$x=6y^2-y-1$	$x = 6(y - 1/12)^2 - 1 \frac{1}{24}$	Right	Narrow	$(-1 \frac{1}{24}, 1/12)$	$y = 1/12$	$(-1, 1/12)$	$x = -1 \frac{1}{12}$	$(,) (,) (,)$
19	$x=y^2+1$	$x = 1(y - 0)^2 + 1$	Right	Normal	$(1, 0)$	$y = 0$	$(1 \frac{1}{4}, 0)$	$x = 3/4$	$(2, 1) (5, 2) (10, 3)$
20	$x=y^2+6y+5$	$x = 1(y + 3)^2 - 4$	Right	Normal	$(-4, -3)$	$y = -3$	$(-3 \frac{3}{4}, -3)$	$x = -4 \frac{1}{4}$	$(-3, -2) (0, 1) (5, 0)$