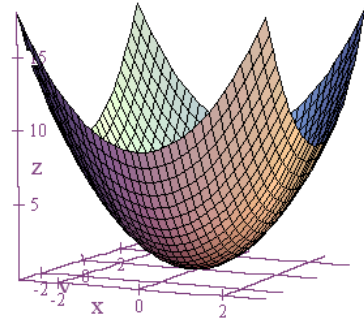


LEVEL CURVES 1

On the sheets that follow, draw the indicated level curves.

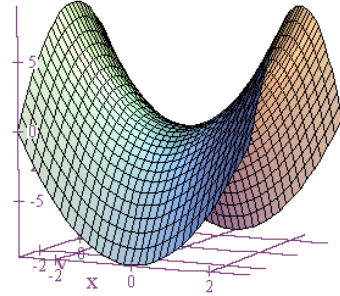
$$z = f(x, y) = x^2 + y^2$$



Draw level curves corresponding to $z = 2, 5, 13, \& 25$.

x\y	-5	-4	-3	-2	-1	0	1	2	3	4	5
-5	50	41	34	29	26	25	26	29	34	41	50
-4	41	32	25	20	17	16	17	20	25	32	41
-3	34	25	18	13	10	9	10	13	18	25	34
-2	29	20	13	8	5	4	5	8	13	20	29
-1	26	17	10	5	2	1	2	5	10	17	26
0	25	16	9	4	1	0	1	4	9	16	25
1	26	17	10	5	2	1	2	5	10	17	26
2	29	20	13	8	5	4	5	8	13	20	29
3	34	25	18	13	10	9	10	13	18	25	34
4	41	32	25	20	17	16	17	20	25	32	41
5	50	41	34	29	26	25	26	29	34	41	50

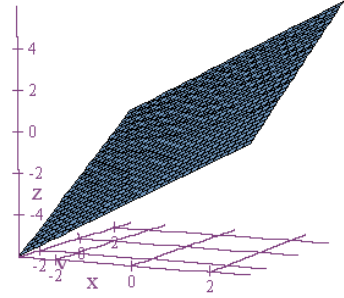
$$z = f(x, y) = x^2 - y^2$$



Draw level curves corresponding to $z = -9, -3, 0, 3, \& 9$.

x\y	-5	-4	-3	-2	-1	0	1	2	3	4	5
-5	0	9	16	21	24	25	24	21	16	9	0
-4	-9	0	7	12	15	16	15	12	7	0	-9
-3	-16	-7	0	5	8	9	8	5	0	-7	-16
-2	-21	-12	-5	0	3	4	3	0	-5	-12	-21
-1	-24	-15	-8	-3	0	1	0	-3	-8	-15	-24
0	-25	-16	-9	-4	-1	0	-1	-4	-9	-16	-25
1	-24	-15	-8	-3	0	1	0	-3	-8	-15	-24
2	-21	-12	-5	0	3	4	3	0	-5	-12	-21
3	-16	-7	0	5	8	9	8	5	0	-7	-16
4	-9	0	7	12	15	16	15	12	7	0	-9
5	0	9	16	21	24	25	24	21	16	9	0

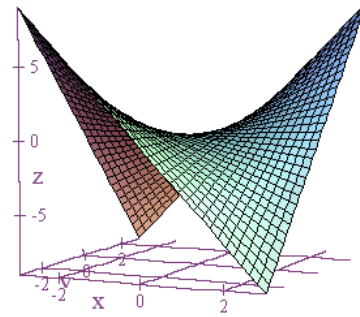
$$z = f(x, y) = x + y$$



Draw level curves corresponding to $z = -5, -2, 0, 2, \& 5$.

x\y	-5	-4	-3	-2	-1	0	1	2	3	4	5
-5	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
-4	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1
-3	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2
-2	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
-1	-6	-5	-4	-3	-2	-1	0	1	2	3	4
0	-5	-4	-3	-2	-1	0	1	2	3	4	5
1	-4	-3	-2	-1	0	1	2	3	4	5	6
2	-3	-2	-1	0	1	2	3	4	5	6	7
3	-2	-1	0	1	2	3	4	5	6	7	8
4	-1	0	1	2	3	4	5	6	7	8	9
5	0	1	2	3	4	5	6	7	8	9	10

$$z = f(x, y) = xy$$



Draw level curves corresponding to $z = -6, -2, 0, 2, \& 6$.

x\y	-5	-4	-3	-2	-1	0	1	2	3	4	5
-5	25	20	15	10	5	0	-5	-10	-15	-20	-25
-4	20	16	12	8	4	0	-4	-8	-12	-16	-20
-3	15	12	9	6	3	0	-3	-6	-9	-12	-15
-2	10	8	6	4	2	0	-2	-4	-6	-8	-10
-1	5	4	3	2	1	0	-1	-2	-3	-4	-5
0	0	0	0	0	0	0	0	0	0	0	0
1	-5	-4	-3	-2	-1	0	1	2	3	4	5
2	-10	-8	-6	-4	-2	0	2	4	6	8	10
3	-15	-12	-9	-6	-3	0	3	6	9	12	15
4	-20	-16	-12	-8	-4	0	4	8	12	16	20
5	-25	-20	-15	-10	-5	0	5	10	15	20	25