

LEVEL CURVES 2 - ANSWERS

For each function below, draw the level curves corresponding to the given values of z . Use the same set of axes for each particular function, and correctly label all x - and y -intercepts.

1. $z = |x| + |y|$ $z = 1$

$$1 = |x| + |y| \Rightarrow |y| = 1 - |x| \Rightarrow y = \pm(1 - |x|), \text{ with } -1 \leq x \leq 1$$

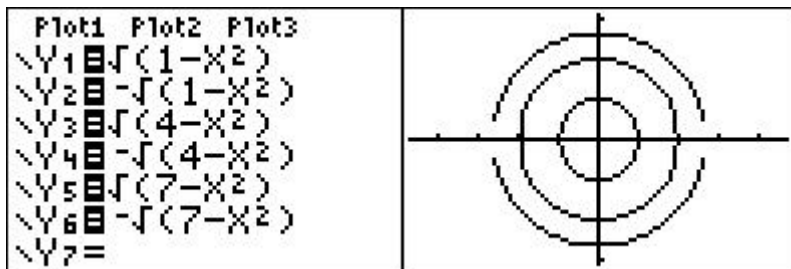


x -intercepts = $-1, 1$

y -intercepts = $-1, 1$

2. $z = x^2 + y^2$ $z = 1, 4, 7$

$$k = x^2 + y^2 \Rightarrow y^2 = k - x^2 \Rightarrow y = \pm\sqrt{k - x^2}$$

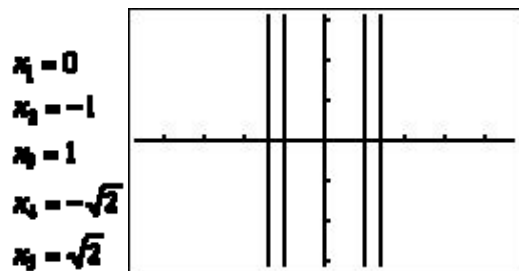


x -intercepts = $-1, 1, -2, 2, -\sqrt{7}, \sqrt{7}$

y -intercepts = $-1, 1, -2, 2, -\sqrt{7}, \sqrt{7}$

3. $z = x^2$ $z = 0, 1, 2$

$$k = x^2 \Rightarrow x = \pm\sqrt{k}$$



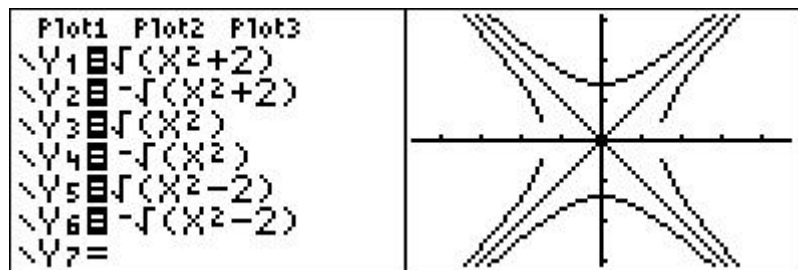
x -intercepts = $-\sqrt{2}, -1, 0, 1, \sqrt{2}$

y -intercepts = for x_1 , all real numbers

4. $z = x^2 - y^2$

$z = -2, 0, 2$

$k = x^2 - y^2 \Rightarrow y^2 = x^2 - k \Rightarrow y = \pm\sqrt{x^2 - k}$



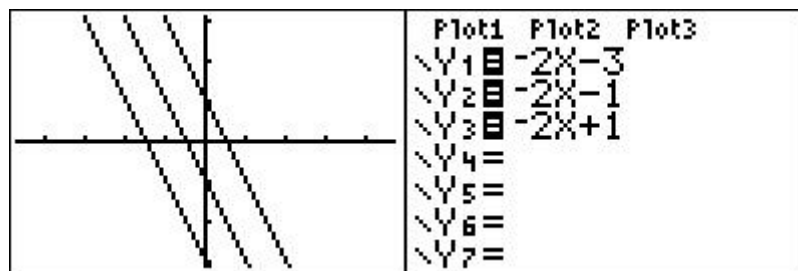
x-intercepts $= -\sqrt{2}, 0, \sqrt{2}$

y-intercepts $= -\sqrt{2}, 0, \sqrt{2}$

5. $z = 2x + y + 1$

$z = -2, 0, 2$

$k = -2x + y + 1 \Rightarrow y = -2x + k - 1$



x-intercepts $= -\frac{3}{2}, -\frac{1}{2}, \frac{1}{2}$

y-intercepts $= -3, -1, 1$