

1. (28 pts) The height of a hill in meters is given by

$$h(x, y) = 9 \sqrt{3 + x^2 + y^2}; \quad x^2 + y^2$$

6. (17 pts) Solve the linear system by finding the inverse of the coefficient matrix.

$$\begin{array}{rcl} \frac{x}{2} & + & z = 1 \\ 2x & - & y = 3 \\ x & + & 3z = 1 \end{array}$$

7. (15 pts) Consider this linear system in variables x and y . Find nonzero constants a , b , c , and d to produce each of the following results. (There are multiple possible answers.)

$$\begin{array}{rcl} 3x + 2y & = & a \\ 3x - 2y & = & b \\ 6x - cy & = & d \end{array}$$

- (a) The system has no solutions.
- (b) The system has a unique solution.
- (c) The system has infinitely many solutions.

8. (16 pts) Given the points $(0;2)$, $(-1;0)$, $(-2;1)$, solve a linear system to find the least-squares line of best fit.