TITLE

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Problem 1. Quadratic Values

(a) Plot the equation $y = x^2 - 1$ for $-5 < x < 5$

(b) What is the minimum?

Solution

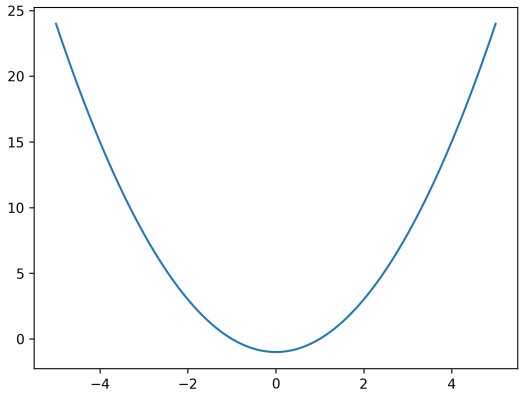
Part (a)

Using the following python code:

```
#!/usr/bin/env python2.7

import matplotlib.pyplot as plt
import numpy as np
import os
script_dir = os.path.dirname(__file__)
image_file = os.path.join(script_dir, '../images/p1.png')


xs = np.linspace(-5, 5, 100)
ys = xs**2 - 1
plt.plot(xs, ys)
plt.savefig(image_file, dpi=300)
```



Part (b)

The minimum is found by looking for zeros in the derivative.

$$\frac{\partial y}{\partial x} = 2x$$

This has a zero at $\boxed{x = 0}$.

Problem 2. Data Analysis

(a) Using the data in sample.csv, find the line of best fit through the data.

(b) Plot this data with the line.

Solution

Part (a)

$m = 0.5$, $b = 1.5$

Part (b)