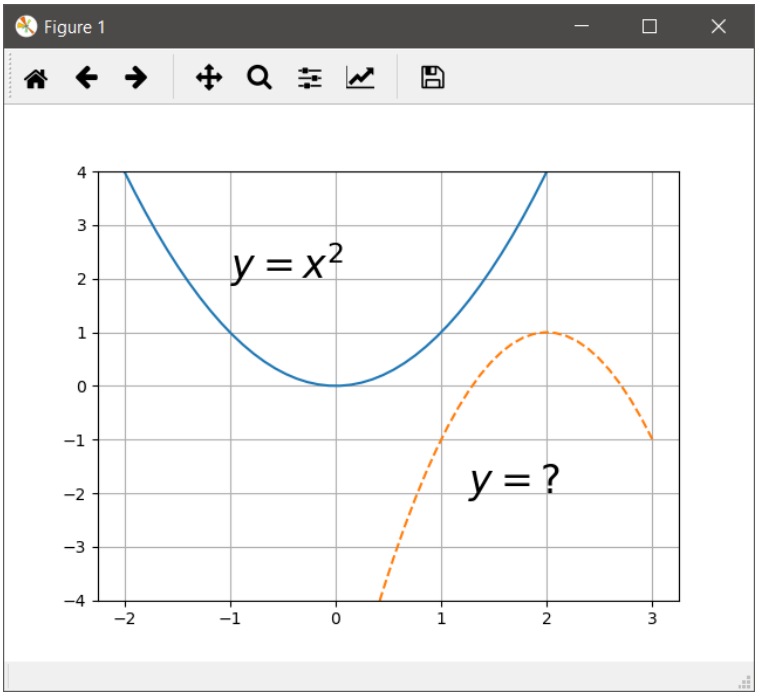
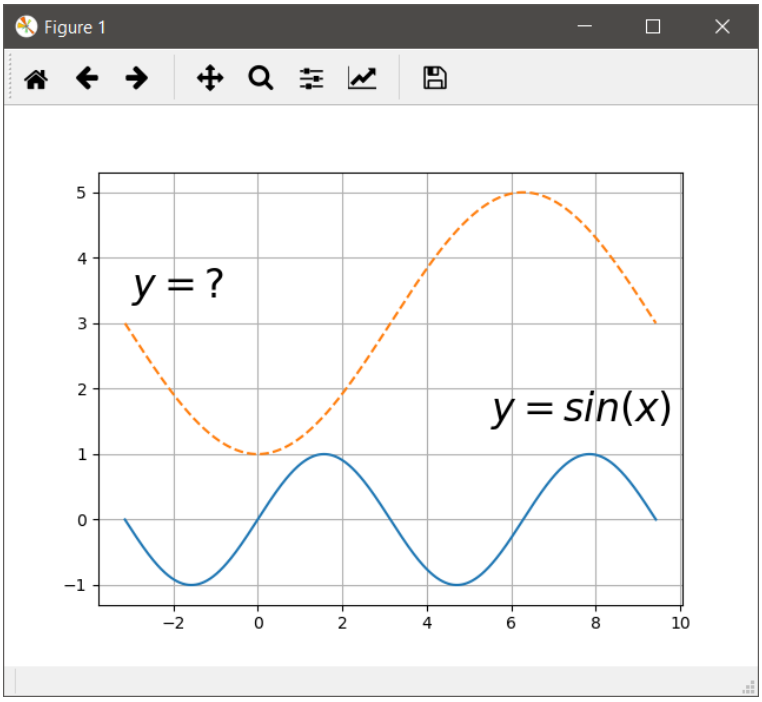
ISTA 331 Curve-fitting Worksheet **Name:**

What is the equation for the dashed curve? `y = -2 * (x - 2)**2 + 1`



What is the equation for the dashed curve in form $y = a * \sin(bx + c) + d$? What is it in form $y = a * \sin(b(x + c)) + d$? `y = 2 * sin(x / 2 - π / 2) + 3; c = π`



Write a function called `get_parabola` that takes a list of 2-element lists and returns the a, b, and c coefficients of the best fit parabola in that order. The first element of each inner list is an *x*-coordinate and the second element is the corresponding *y*-coordinate.

```
def get_parabola(xy_lst):
    x = np.array([coords[0] for coords in xy_lst])
    y_lst = [coords[1] for coords in xy_lst]
    X = np.column_stack([x, x**2])
    X = sm.add_constant(X)
    model = sm.OLS(y_lst, X)
    results = model.fit()
    # results.params is an array because we fit to a list, not a Series
    # order is reversed (sort of) compared to if it was a Series
    return results.params[2], results.params[1], results.params[0]
```