```python
from math import sin, cos, pi

import pandas as pd

from sklearn.metrics import (
    average_precision_score,
    confusion_matrix,
    accuracy_score,
    precision_recall_curve,
    precision_recall_fscore_support,
    roc_auc_score,
    roc_curve,
)


def preprocess_data(df):
    """Add in externally obtained location data and clean certain categorical field containing NaN"""
    df = df.dropna(subset=["RainToday", "RainTomorrow"])
    df["RainToday"] = df["RainToday"].replace("No", 0).replace("Yes", 1).astype(float)
    df["RainTomorrow"] = (
        df["RainTomorrow"].replace("No", 0).replace("Yes", 1).astype(float)
    )
    df["WindGustDir"] = df["WindGustDir"].fillna("NaN")
    df["WindDir9am"] = df["WindDir9am"].fillna("NaN")
    df["WindDir3pm"] = df["WindDir3pm"].fillna("NaN")

    df["Date"] = pd.to_datetime(df["Date"])

    latitude_longitude = {
        "Adelaide": {"Latitude": 34.9285, "Longitude": 138.6007},
        "Albany": {"Latitude": 35.0269, "Longitude": 117.8837},
        "Albury": {"Latitude": 36.0737, "Longitude": 146.9135},
        "AliceSprings": {"Latitude": 23.6980, "Longitude": 133.8807},
        "BadgerysCreek": {"Latitude": 33.8829, "Longitude": 150.7609},
        "Ballarat": {"Latitude": 37.5622, "Longitude": 143.8503},
        "Bendigo": {"Latitude": 36.7570, "Longitude": 144.2794},
        "Brisbane": {"Latitude": 27.4705, "Longitude": 153.0260},
        "Cairns": {"Latitude": 16.9186, "Longitude": 145.7781},
        "Canberra": {"Latitude": 35.2809, "Longitude": 149.1300},
        "Cobar": {"Latitude": 31.4958, "Longitude": 145.8389},
        "CoffsHarbour": {"Latitude": 30.2986, "Longitude": 153.1094},
        "Dartmoor": {"Latitude": 37.9144, "Longitude": 141.2730},
        "Darwin": {"Latitude": 12.4637, "Longitude": 130.8444},
        "GoldCoast": {"Latitude": 28.0167, "Longitude": 153.4000},
        "Hobart": {"Latitude": 42.8826, "Longitude": 147.3257},
        "Katherine": {"Latitude": 14.4520, "Longitude": 132.2699},
        "Launceston": {"Latitude": 41.4391, "Longitude": 147.1358},
        "Melbourne": {"Latitude": 37.8136, "Longitude": 144.9631},
        "MelbourneAirport": {"Latitude": 37.6690, "Longitude": 144.8410},
```