```
!pip install prophet pandas matplotlib scikit-learn --quiet
```

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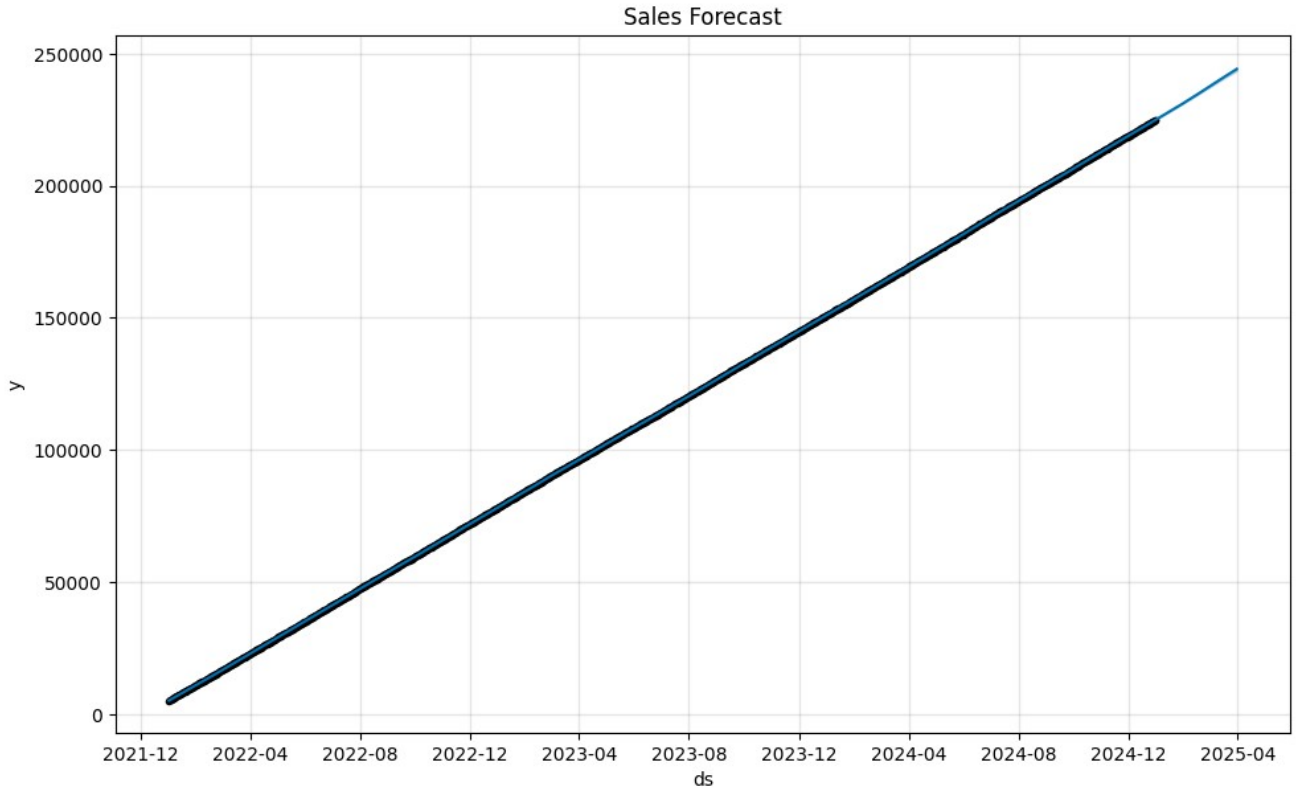
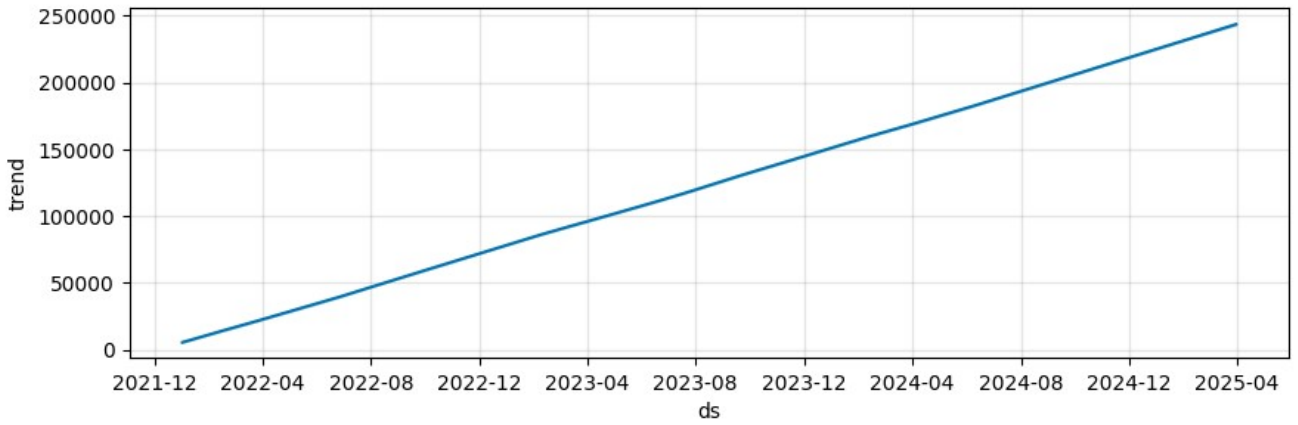
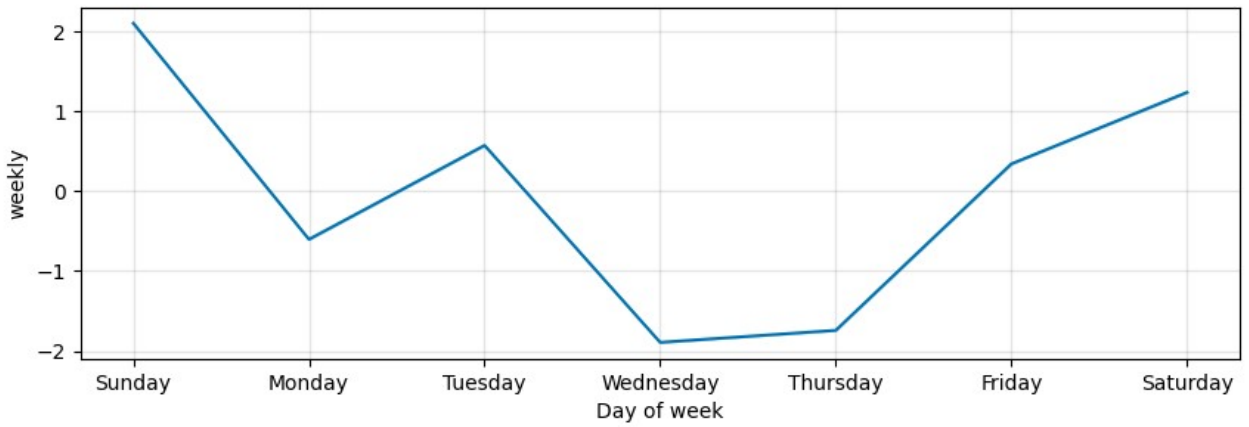
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from prophet import Prophet
from sklearn.metrics import mean_absolute_error, mean_squared_error
from sklearn.linear_model import LinearRegression
from datetime import timedelta
dates = pd.date_range(start='2022-01-01', end='2024-12-31', freq='D')
np.random.seed(42)
sales = np.random.normal(loc=200, scale=20, size=len(dates)).cumsum() + 5000
df = pd.DataFrame({'Date': dates, 'Sales': sales})
df_prophet = df.rename(columns={'Date': 'ds', 'Sales': 'y'})
model = Prophet(daily_seasonality=True)
model.fit(df_prophet)
future = model.make_future_dataframe(periods=90)
forecast = model.predict(future)
fig1 = model.plot(forecast)
plt.title('Sales Forecast')
plt.show()
fig2 = model.plot_components(forecast)
plt.show()
df['Days'] = (df['Date'] - df['Date'].min()).dt.days
X = df[['Days']]
y = df['Sales']
reg = LinearRegression().fit(X, y)
df['Predicted_Trend'] = reg.predict(X)
plt.figure(figsize=(10, 5))
plt.plot(df['Date'], df['Sales'], label='Actual Sales')
plt.plot(df['Date'], df['Predicted_Trend'], label='Trend (Linear Regression)', color='red')
plt.legend()
plt.title('Sales and Linear Trend')
plt.xlabel('Date')
plt.ylabel('Sales')
plt.show()
df_eval = df_prophet[-30:]
forecast_eval = forecast.set_index('ds').loc[df_eval['ds']]
mae = mean_absolute_error(df_eval['y'], forecast_eval['yhat'])
rmse = np.sqrt(mean_squared_error(df_eval['y'], forecast_eval['yhat']))
print(f"Evaluation on last 30 days:\nMAE: {mae:.2f}\nRMSE: {rmse:.2f}")
forecast_export = forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']]
forecast_export.to_csv("sales_forecast.csv", index=False)
print("Forecast saved as 'sales_forecast.csv'")
```

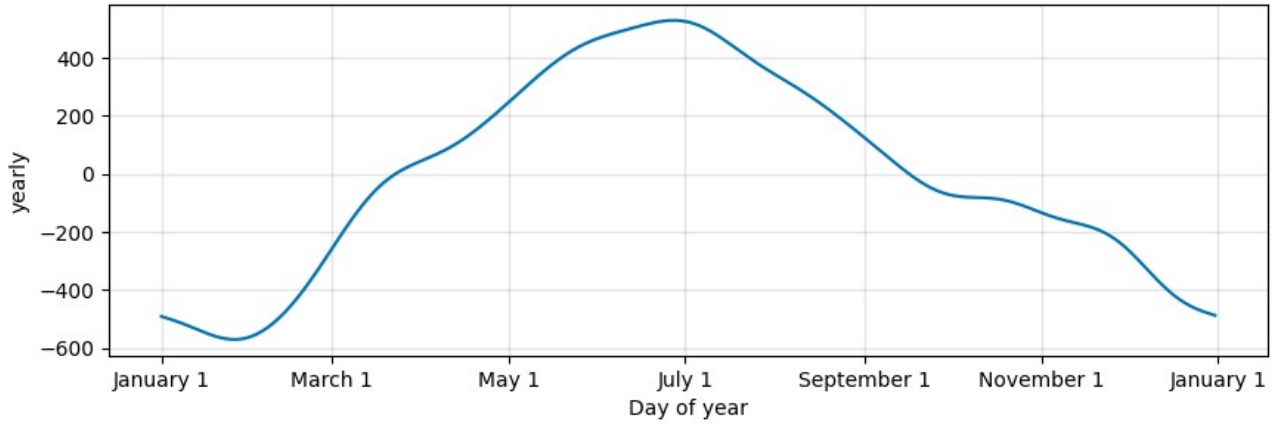
```
DEBUG:cmdstanpy:input tempfile: /tmp/tmpzxvjn9yu/l0zhubkd.json
DEBUG:cmdstanpy:input tempfile: /tmp/tmpzxvjn9yu/w5mrpglg.json
```

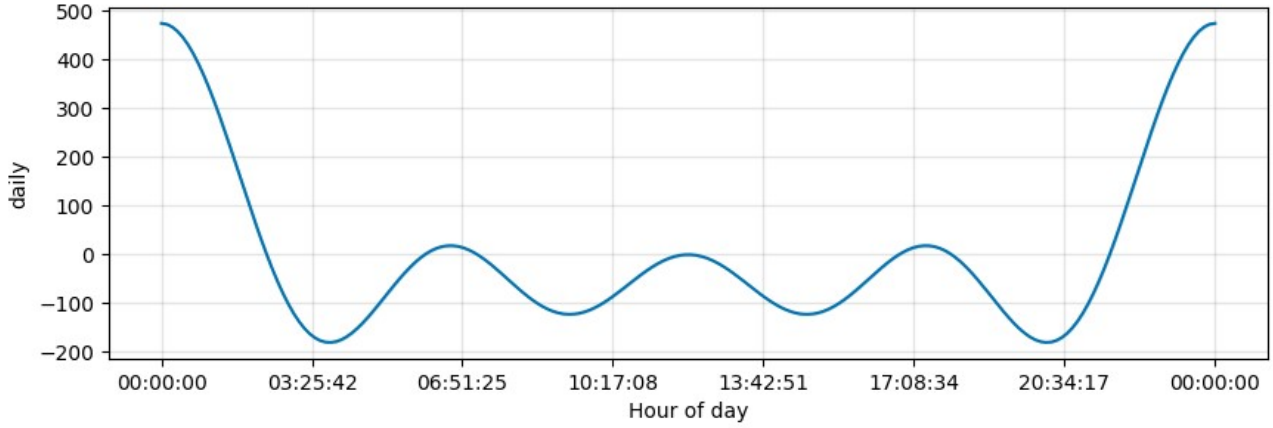
```
DEBUG:cmdstanpy:idx 0
DEBUG:cmdstanpy:running CmdStan, num_threads: None
DEBUG:cmdstanpy:CmdStan args: ['/usr/local/lib/python3.11/dist-packages/prophet/stan_mc
07:12:09 - cmdstanpy - INFO - Chain [1] start processing
INFO:cmdstanpy:Chain [1] start processing
07:12:11 - cmdstanpy - INFO - Chain [1] done processing
INFO:cmdstanpy:Chain [1] done processing
```

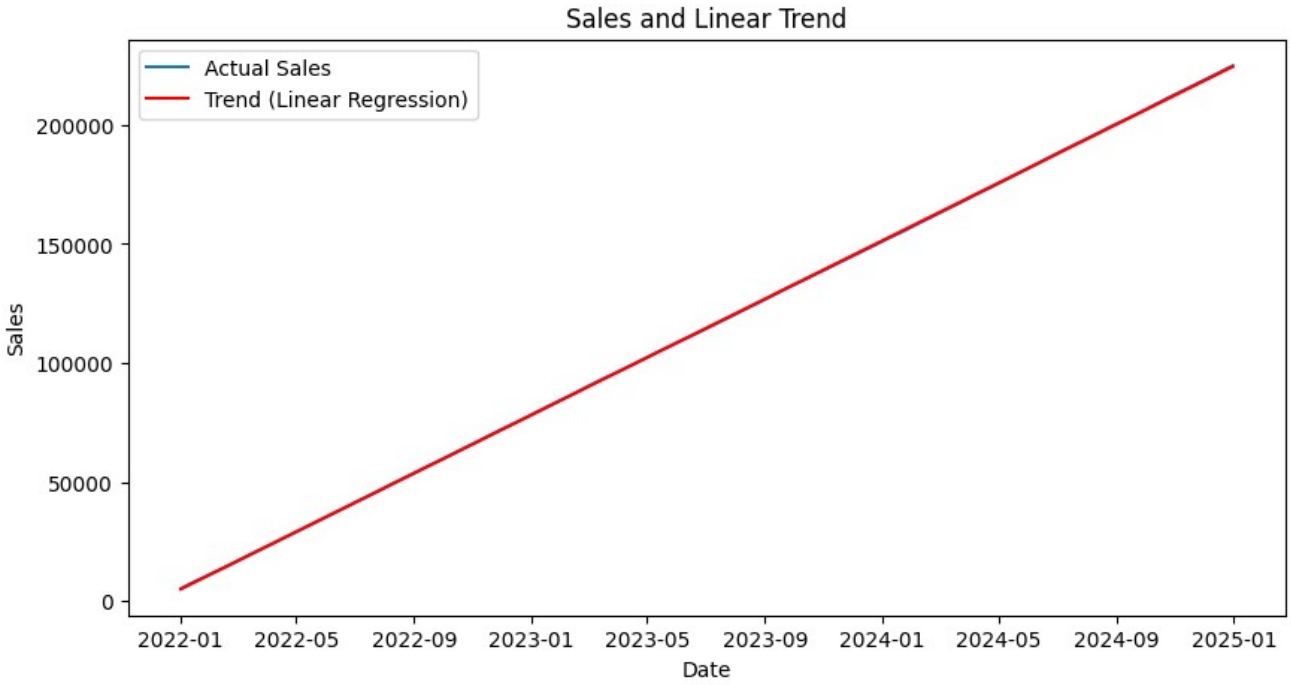










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Evaluation on last 30 days:
MAE: 36.17
RMSE: 39.64
Forecast saved as 'sales_forecast.csv'
```