2

In [1]:

import pandas as pd  
import numpy as np  
from sklearn.linear\_model import LinearRegression  
import matplotlib.pyplot as plt   
from sklearn.metrics import r2\_score

In [2]:

data = {  
 'Car\_Age': [4, 4, 5, 5, 7, 7, 8, 9, 10],  
 'Price': [6300, 5800, 5700, 4500, 4500, 4200, 4100, 3100, 2100]  
}  
  
df = pd.DataFrame(data)

In [3]:

x = df['Car\_Age'].values.reshape(-1, 1)  
y = df['Price'].values  
model = LinearRegression()  
model.fit(x, y)

Out[3]:

LinearRegression()

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.**  
**On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

  LinearRegression[?Documentation for LinearRegression](https://scikit-learn.org/1.5/modules/generated/sklearn.linear_model.LinearRegression.html)iFitted

LinearRegression()

In [4]:

predictions = model.predict(x);

In [5]:

%matplotlib inline  
plt.scatter(x, y, marker='+', color='red', label='Actual Price')  
plt.plot(x, predictions, color='blue', label='Predicted Price')  
plt.xlabel("Car Age (in years)")  
plt.ylabel("Price (in dollars)")  
plt.legend()

Out[5]:

<matplotlib.legend.Legend at 0x769e7f8a7a70>

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In [6]:

print(f"y = {model.coef\_[0]:.2f}x + {model.intercept\_:.2f}")  
print(f'Coefficient: {model.coef\_[0]:.2f}') # if the coefficient is negative then negative correlation. we can even infer from the plot.

y = -580.52x + 8283.43  
Coefficient: -580.52

In [7]:

print(f"R2 Score: {r2\_score(y, predictions):.2f}") # if nearer to 1 then we have the perfect fit model.

R2 Score: 0.90

In [8]:

test\_car\_age = np.array([2.5, 4, 8.6, 4.5]).reshape(-1, 1);  
predictions = model.predict(test\_car\_age)  
  
for car\_age, price in zip(test\_car\_age, predictions):  
 print(f"For a {car\_age[0]} years old car, price is ${price:.2f}.")

For a 2.5 years old car, price is $6832.12.  
For a 4.0 years old car, price is $5961.34.  
For a 8.6 years old car, price is $3290.93.  
For a 4.5 years old car, price is $5671.08.