In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [6]:
```
df=pd.read_csv("C:/Users/Admin/Downloads/Advertising.csv")
df.head()
```

Out[6]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9

In [7]:
```
df.shape
```

Out[7]:
```
(200, 5)
```

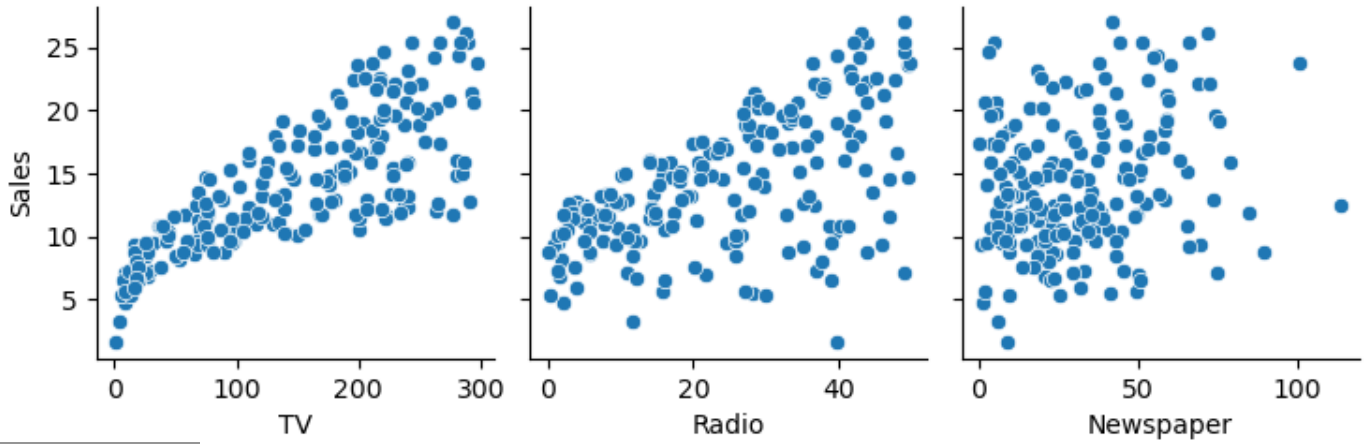
In [8]:
```
df.describe()
```

Out[8]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
count	200.000000	200.000000	200.000000	200.000000	200.000000
mean	100.500000	147.042500	23.264000	30.554000	14.022500
std	57.879185	85.854236	14.846809	21.778621	5.217457
min	1.000000	0.700000	0.000000	0.300000	1.600000
25%	50.750000	74.375000	9.975000	12.750000	10.375000
50%	100.500000	149.750000	22.900000	25.750000	12.900000
75%	150.250000	218.825000	36.525000	45.100000	17.400000
max	200.000000	296.400000	49.600000	114.000000	27.000000

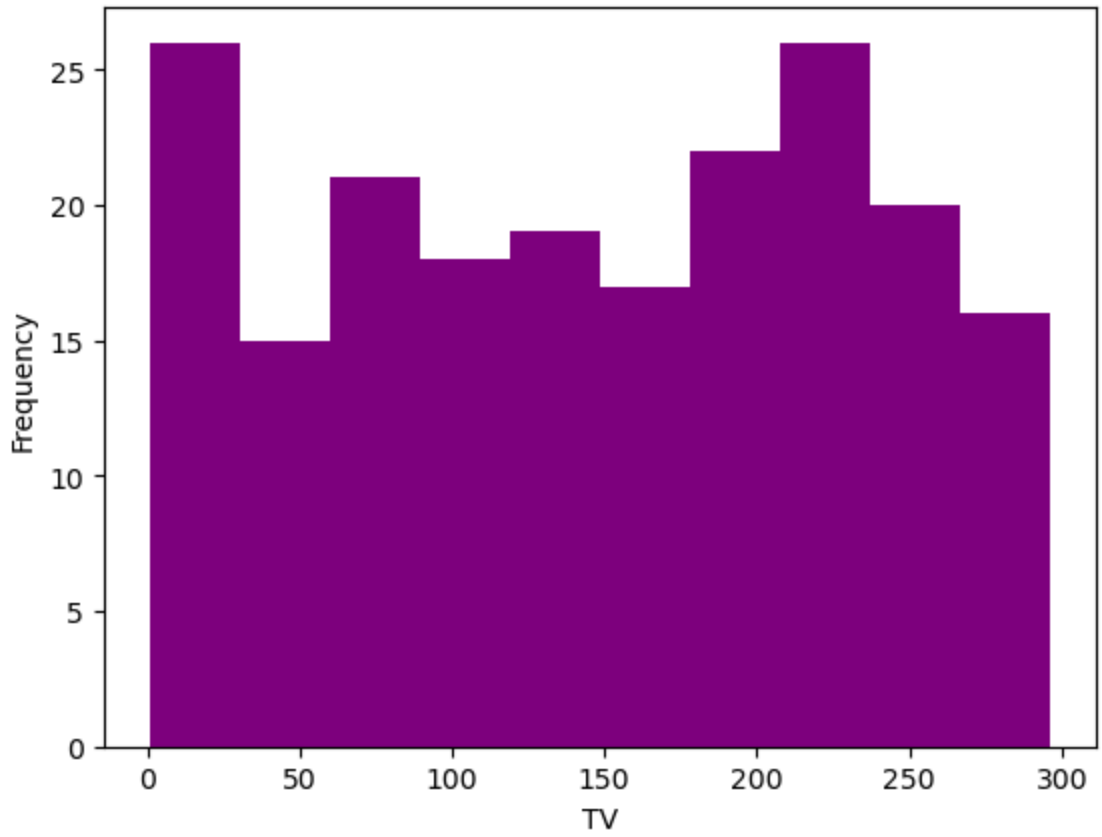
In [9]:
```
sns.pairplot(df,x_vars=['TV','Radio','Newspaper'],y_vars='Sales',kind='scatter')
plt.show()
```

```
C:\Users\Admin\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning: The fig
ure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



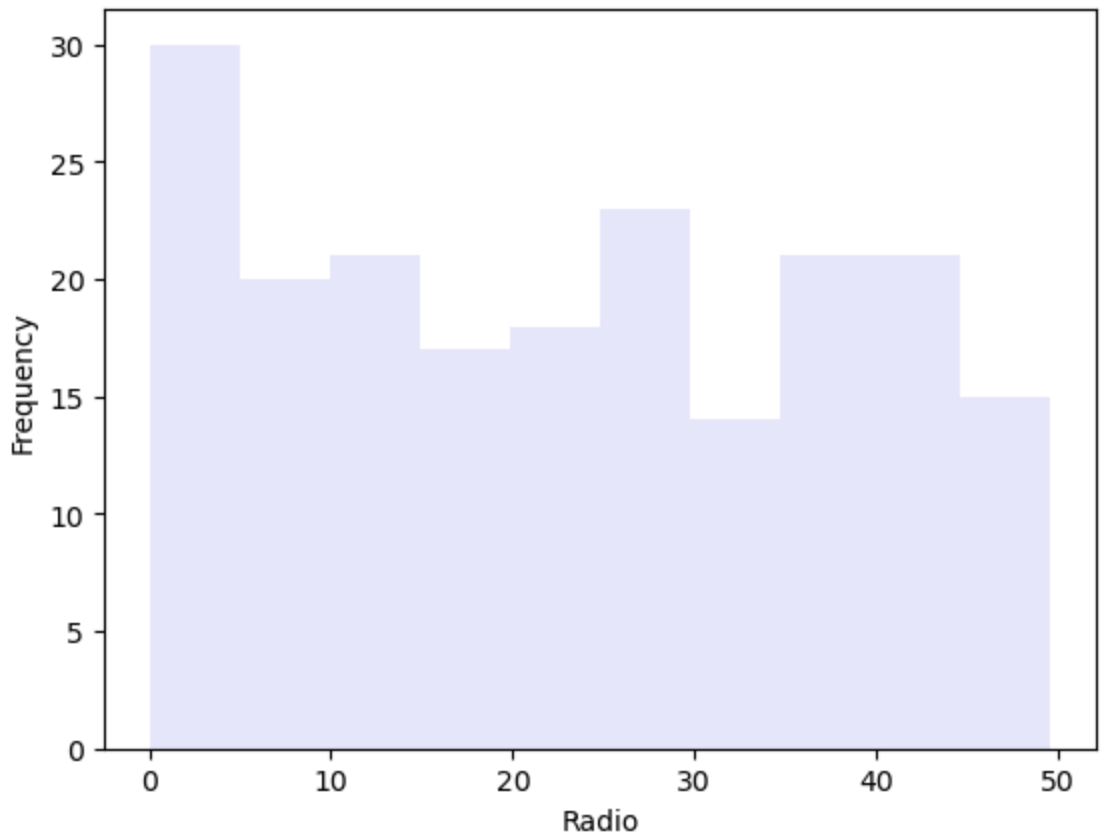
In [17]:
```
df['TV'].plot.hist(bins=10,color="purple",xlabel="TV")
```

Out[17]:
```
<Axes: xlabel='TV', ylabel='Frequency'>
```



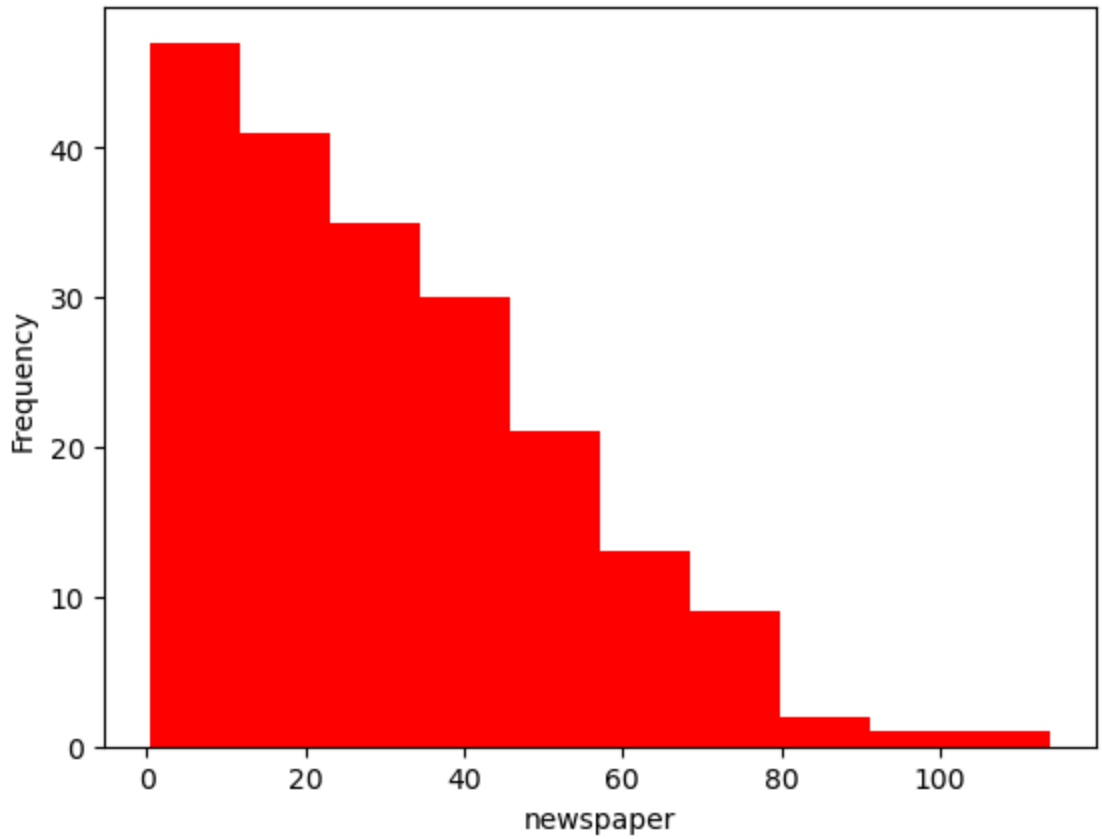
In [16]:
```
df['Radio'].plot.hist(bins=10,color="lavender",xlabel="Radio")
```

Out[16]:
```
<Axes: xlabel='Radio', ylabel='Frequency'>
```

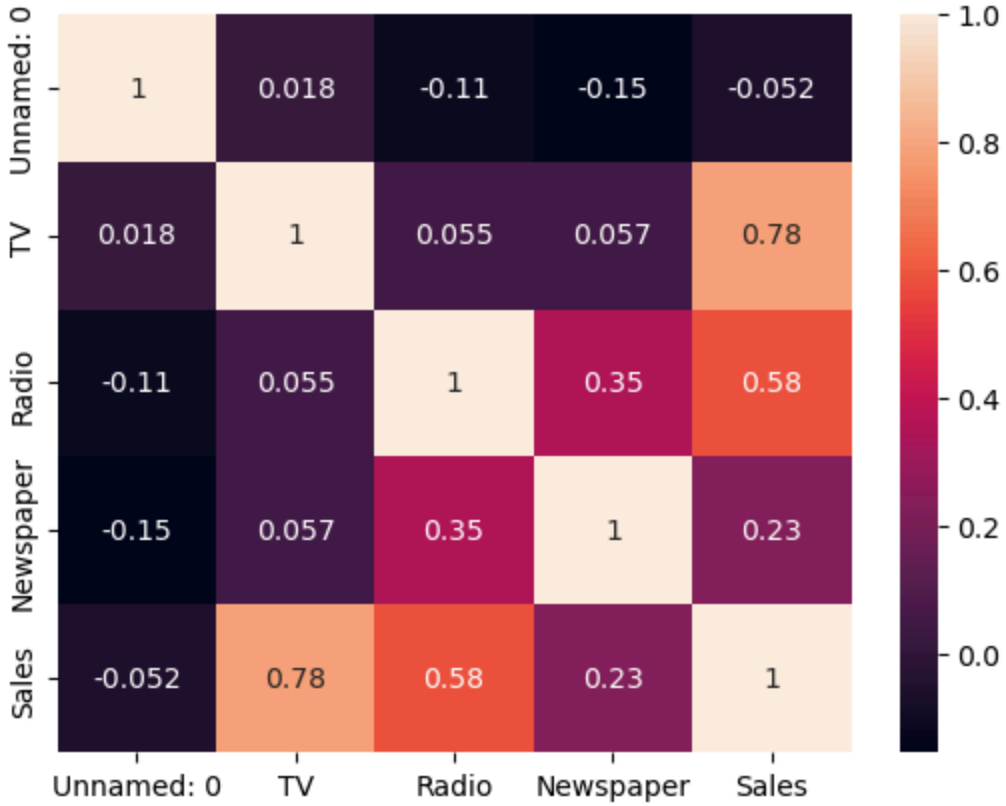


In [13]:
```
df['Newspaper'].plot.hist(bins=10,color="red",xlabel="newspaper")
```

Out[13]: <Axes: xlabel='newspaper', ylabel='Frequency'>



In [18]:
```
sns.heatmap(df.corr(),annot=True)
plt.show()
```



In [19]:
```
from sklearn.model_selection import train_test_split
x_train,x_tests,y_train,y_test=train_test_split(df[['TV']],df[['Sales']],test_size=0.3,r
```

In [20]:
```
print(x_train)
```

```
        TV
131  265.2
96   197.6
181  218.5
19   147.3
153  171.3
..     ...
67   139.3
192   17.2
117   76.4
47   239.9
172   19.6

[140 rows x 1 columns]
```

In [21]:
```
print(y_train)
```

```
     Sales
131   12.7
96    11.7
181   12.2
19    14.6
153   19.0
..     ...
67    13.4
192    5.9
117    9.4
47    23.2
172    7.6

[140 rows x 1 columns]
```

In [23]:
```
from sklearn.linear_model import LinearRegression
model=LinearRegression()
model.fit(x_train,y_train)
```

Out[23]:
```
▼ LinearRegression

LinearRegression()
```

In [26]:
```
res=model.predict(x_tests)
print(res)
```

```
[[10.48116264]
 [ 9.60152727]
 [11.4524267 ]
 [20.58322509]
 [15.1084112 ]
 [ 9.8855762 ]
 [ 7.70939494]
 [18.31083372]
 [ 8.40119151]
 [16.36372418]
 [19.28209777]
 [11.3058208 ]
 [14.48533615]
 [15.91474363]
 [10.81102591]
 [12.81769409]
 [19.47909945]
 [ 7.3428802 ]
 [10.73314153]
 [17.08759078]
 [20.48701497]
 [13.73856237]
 [15.33290148]
 [13.34455903]
 [ 9.76187747]
 [12.95055569]
 [14.89766523]
 [16.70275031]
 [17.57322281]
 [ 8.46075015]
 [10.41702256]
 [16.42328282]
 [20.17089601]
 [18.38413667]
 [ 7.91555948]
 [ 8.16753836]
 [10.04134496]
 [15.59404323]
 [10.44451117]
 [ 8.45616872]
 [ 9.00135939]
 [ 8.75396194]
 [13.85767966]
 [16.91349628]
 [17.17921947]
 [12.01594311]
 [ 7.70481351]
 [ 8.08507255]
 [13.06967298]
 [12.10299036]
 [12.34122494]
 [17.82520169]
 [18.93849021]
 [15.78188203]
 [ 9.35871126]
 [10.16504368]
 [20.72983099]
 [15.21378419]
 [16.58821446]
 [ 7.64525486]]
```

In [27]:
```
model.coef_
```

Out[27]:
```
array([[0.04581434]])
```

In [28]:
```
model.intercept_
```

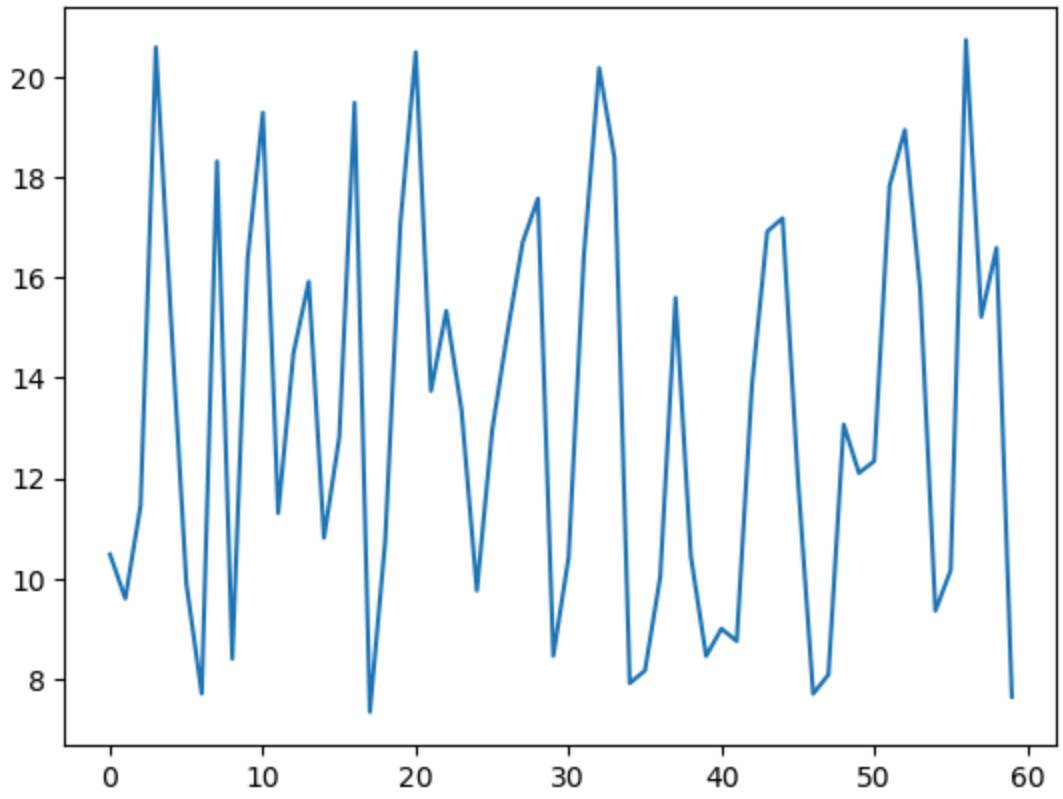
Out[28]:
```
array([7.31081017])
```

In [29]:
```
0.05473199*69.2+7.14382225
```

Out[29]:
```
10.931275958
```

In [30]:
```
plt.plot(res)
```

Out[30]:
```
[<matplotlib.lines.Line2D at 0x20b30d0c310>]
```



In [34]:
```
plt.scatter(x_tests,y_test)
plt.plot(x_tests,7.14382225+0.05473199*x_tests,'r')
plt.show()
```