زئير

In [30]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
data=pd.read_csv("customer .csv")
```

In [27]:

```
data.head()
```

Out[27]:

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines
0	7590-VHVEG	Female	NaN	Yes	No	NaN	No	No phone service
1	5575-GNVDE	Male	NaN	No	No	34.0	Yes	No
2	3668-QPYBK	Male	NaN	No	No	2.0	Yes	No
3	7795-CFOCW	Male	NaN	No	No	45.0	No	No phone service
4	9237-HQITU	Female	NaN	No	No	2.0	Yes	No

5 rows × 21 columns

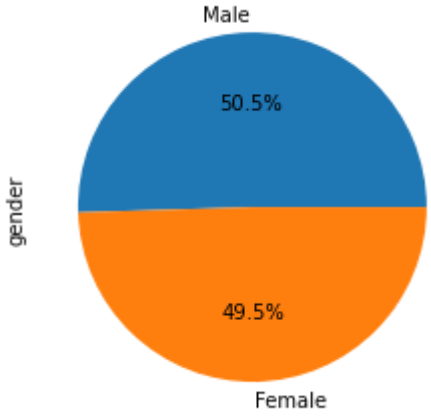
what is the ratio between males and females in our company?

In [28]:

```
round(data['gender'].value_counts()/data.shape[0]*100,2).plot.pie(autopct='%1.1f%%')
```

Out[28]:

```
<AxesSubplot:ylabel='gender'>
```



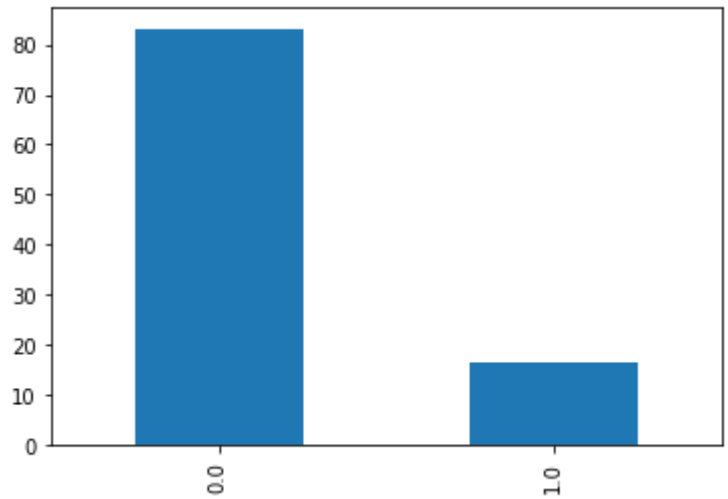
what is the ratio between Senior Citizens and others in our company?

In [31]:

```
round(data['SeniorCitizen'].value_counts()/data.shape[0]*100,2).plot.bar()
```

Out[31]:

<AxesSubplot:>

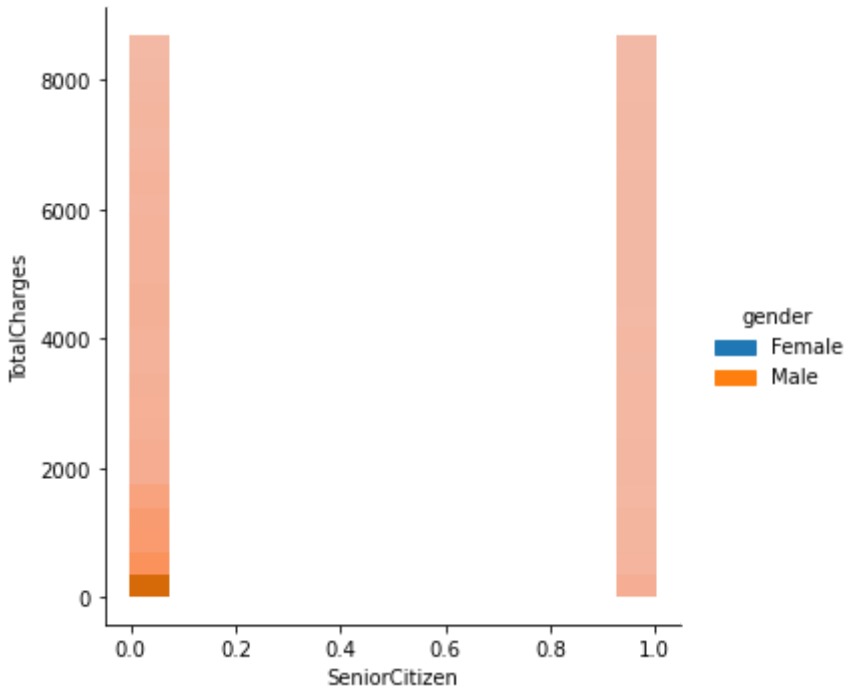


In [25]:

```
sns.displot(data=data, x="SeniorCitizen", y="TotalCharges", hue="gender")
```

Out[25]:

<seaborn.axisgrid.FacetGrid at 0x1d019099910>

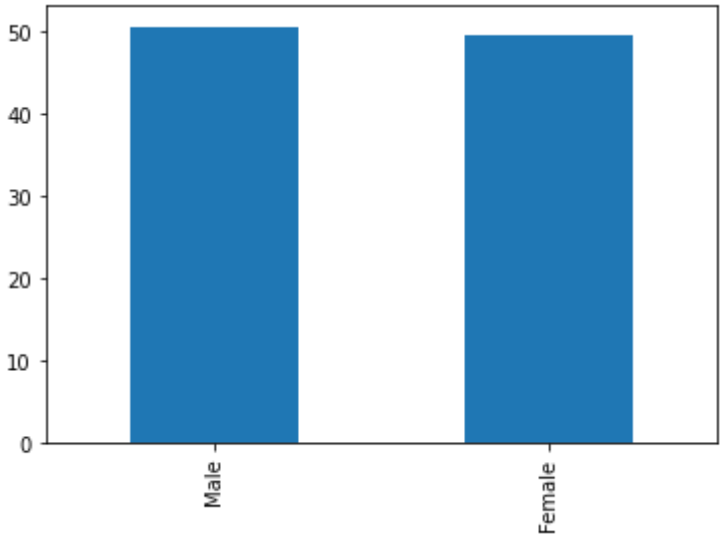


In [20]:

```
round(data['gender'].value_counts()/data.shape[0]*100,2).plot.bar()
```

Out[20]:

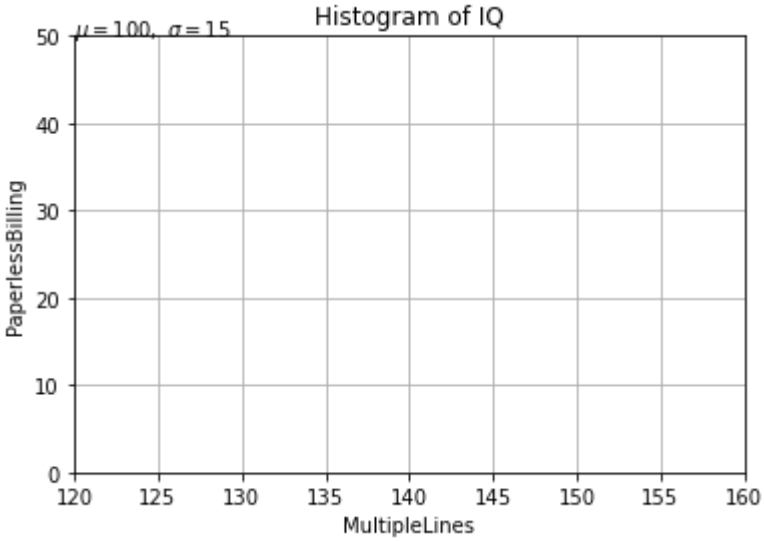
<AxesSubplot:>



In [8]:

```
plt.xlabel('MultipleLines')
plt.ylabel('PaperlessBilling')
plt.title('Histogram of IQ')
plt.text( 120,50, r'$\mu=100,\ \sigma=15$')

plt.axis([120, 160, 0, 50])
plt.grid(True)
plt.show()
```



In [18]:

```
data['Dependents'].value_counts()
```

Out[18]:

```
No     4933
Yes    2110
Name: Dependents, dtype: int64
```

Type *Markdown* and LaTeX: α^2

In [32]:

```
def offer (row):
        if row['gender']=="Male"and row["SeniorCitizen"]==1:
         return "meale_Senior"
        elif row['gender']=="Male" and row["SeniorCitizen"]==0:
         return "meale_jenior"
        elif row['gender']=="female" and row["SeniorCitizen"]==1:
         return "female_Senior"
        elif row['gender']=="female" and row["SeniorCitizen"]==0:
         return "female_jenior"
        else :
         return "other"
```

In [33]:

```
data['offer']=data.apply(offer,axis = 1)
data.tail(15)
```

Out[33]:

tService	OnlineSecurity	...	TechSupport	StreamingTV	StreamingMovies	Contract	PaperlessBill
DSL	No	...	Yes	Yes	No	Two year	
DSL	No	...	No	Yes	Yes	Month-to-month	
No	No internet service	...	No internet service	No internet service	No internet service	Month-to-month	
DSL	Yes	...	No	No	No	One year	
iber optic	No	...	No	No	No	Month-to-month	
iber optic	No	...	No	No	No	Month-to-month	
iber optic	Yes	...	No	Yes	No	Month-to-month	
iber optic	No	...	No	Yes	No	Month-to-month	
DSL	No	...	Yes	Yes	Yes	One year	
No	No internet service	...	No internet service	No internet service	No internet service	Two year	
DSL	Yes	...	Yes	Yes	Yes	One year	
iber optic	No	...	No	Yes	Yes	One year	
DSL	Yes	...	No	No	No	Month-to-month	
iber optic	No	...	No	No	No	Month-to-month	
iber optic	Yes	...	Yes	Yes	Yes	Two year	

In [35]:

```
data['TotalCharges'].idxmax()
```

Out[35]:

```
4610
```

In [37]:

```
data.iloc[4610]
```

Out[37]:

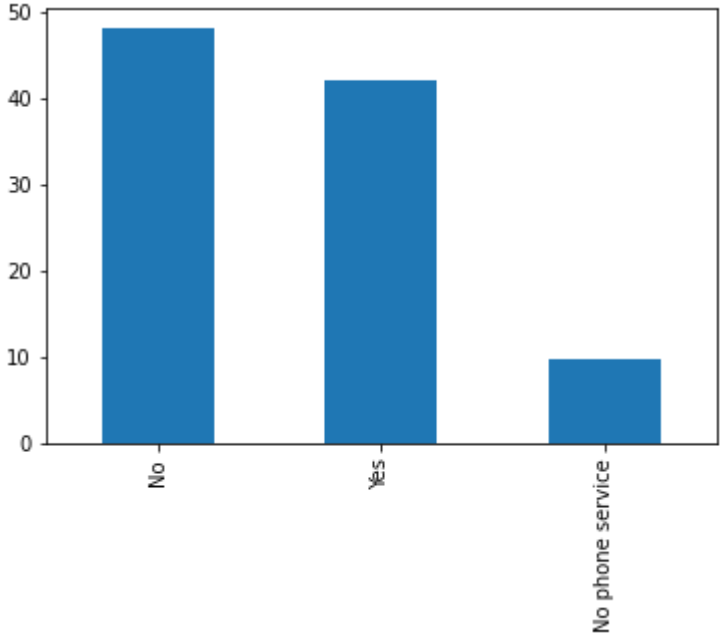
```
customerID                          2889-FPWRM
gender                                    Male
SeniorCitizen                              0.0
Partner                                    Yes
Dependents                                  No
tenure                                    72.0
PhoneService                               Yes
MultipleLines                              Yes
InternetService                    Fiber optic
OnlineSecurity                             Yes
OnlineBackup                               Yes
DeviceProtection                           Yes
TechSupport                                Yes
StreamingTV                                Yes
StreamingMovies                            Yes
Contract                              One year
PaperlessBilling                           Yes
PaymentMethod       Bank transfer (automatic)
MonthlyCharges                            117.8
TotalCharges                             8684.8
Churn                                      Yes
offer                             meale_jenior
Name: 4610, dtype: object
```

In [39]:

```
round(data['MultipleLines'].value_counts()/data.shape[0]*100,2).plot.
```

Out[39]:

```
<AxesSubplot:>
```



We want to give offers according to the monthly charge categories, can you explain that? Using Visulization

In [1]:

```
def offerr (row):
        if row['MonthlyCharges']>=50 :
         return "MonthlyChargesoffer"

         return "other"
```

In [5]:

```
data['offerr']=data.apply(offer,axis = 1)
data.tail(15)
```

Out[5]:

reamingTV	StreamingMovies	Contract	PaperlessBilling	PaymentMethod	MonthlyCharges	TotalCh
Yes	No	Two year	No	Bank transfer (automatic)	64.10	4
Yes	Yes	Month-to-month	Yes	Electronic check	44.40	
No internet service	No internet service	Month-to-month	Yes	Mailed check	20.05	
No	No	One year	No	Credit card (automatic)	60.00	3
No	No	Month-to-month	Yes	Electronic check	75.75	
No	No	Month-to-month	Yes	Credit card (automatic)	69.50	2
Yes	No	Month-to-month	Yes	Credit card (automatic)	102.95	6
Yes	No	Month-to-month	Yes	Bank transfer (automatic)	78.70	1
Yes	Yes	One year	No	Electronic check	60.65	
No internet service	No internet service	Two year	Yes	Bank transfer (automatic)	21.15	1
Yes	Yes	One year	Yes	Mailed check	84.80	1
Yes	Yes	One year	Yes	Credit card (automatic)	103.20	7
No	No	Month-to-month	Yes	Electronic check	29.60	
No	No	Month-to-month	Yes	Mailed check	74.40	
Yes	Yes	Two year	Yes	Bank transfer (automatic)	105.65	6

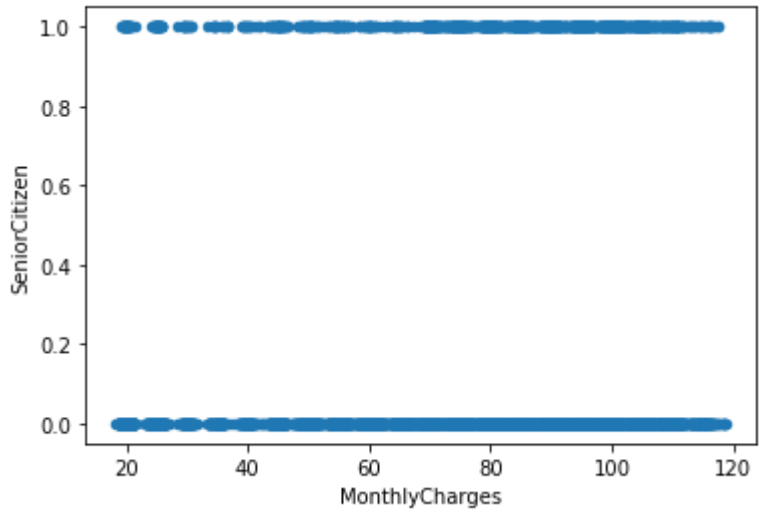
From the correlation matrix ,What is the relationship between the Senior Citizens and the monthly charging rate?

In [3]:

```
data[['MonthlyCharges', 'SeniorCitizen']].plot.scatter(x ='MonthlyCharges', y='SeniorCitize
```

Out[3]:

```
<AxesSubplot:xlabel='MonthlyCharges', ylabel='SeniorCitizen'>
```



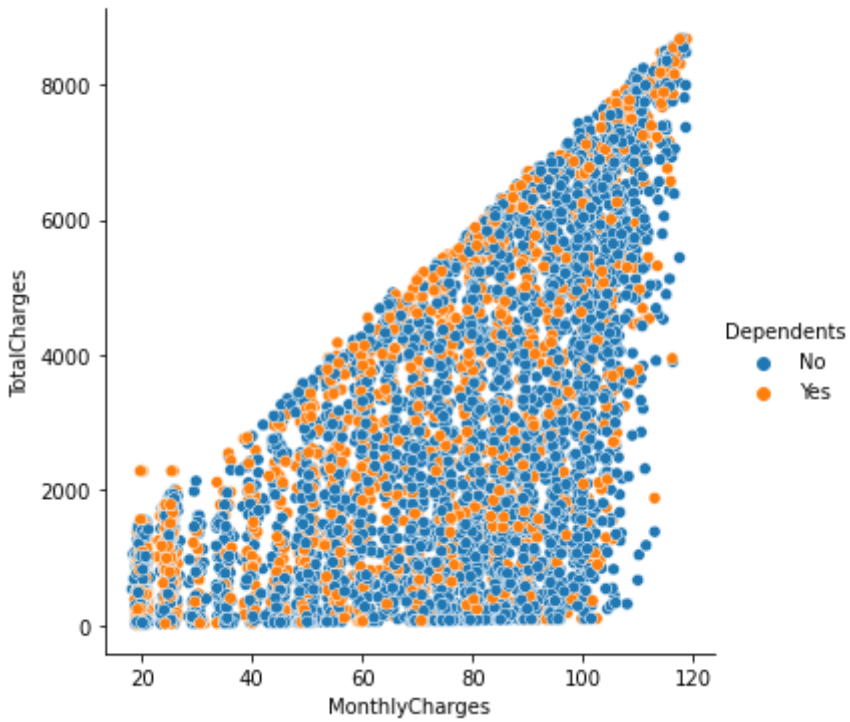
Is there a strong relationship between the monthly recharge rate and the dependents?

In [10]:

```
sns.relplot(data=data, x="MonthlyCharges", y="TotalCharges", hue="Dependents")
```

Out[10]:

```
<seaborn.axisgrid.FacetGrid at 0x1e4e37a82b0>
```

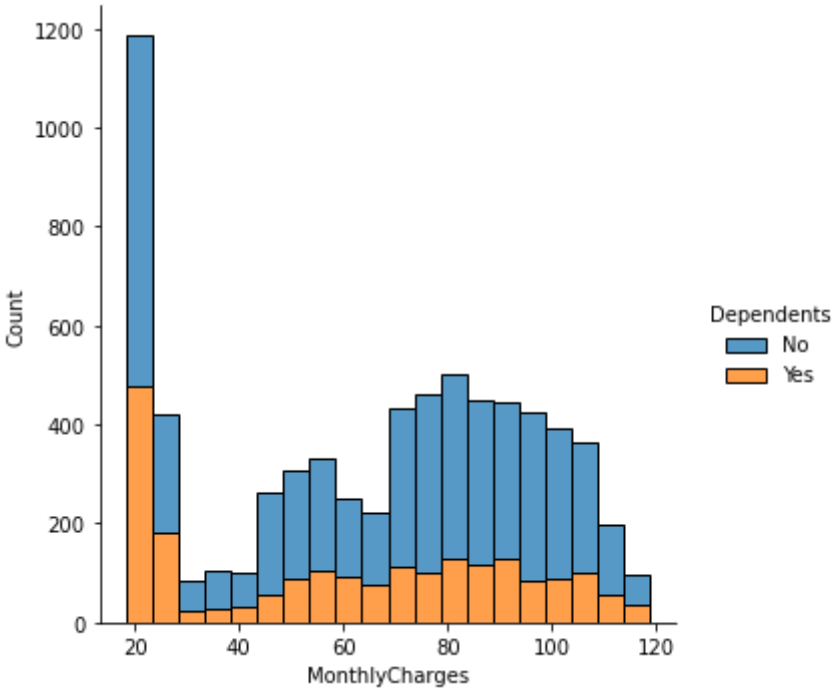


In [11]:

```
sns.displot(data, x="MonthlyCharges", bins=20,hue="Dependents", multiple="stack")
```

Out[11]:

```
<seaborn.axisgrid.FacetGrid at 0x1e4e3756160>
```



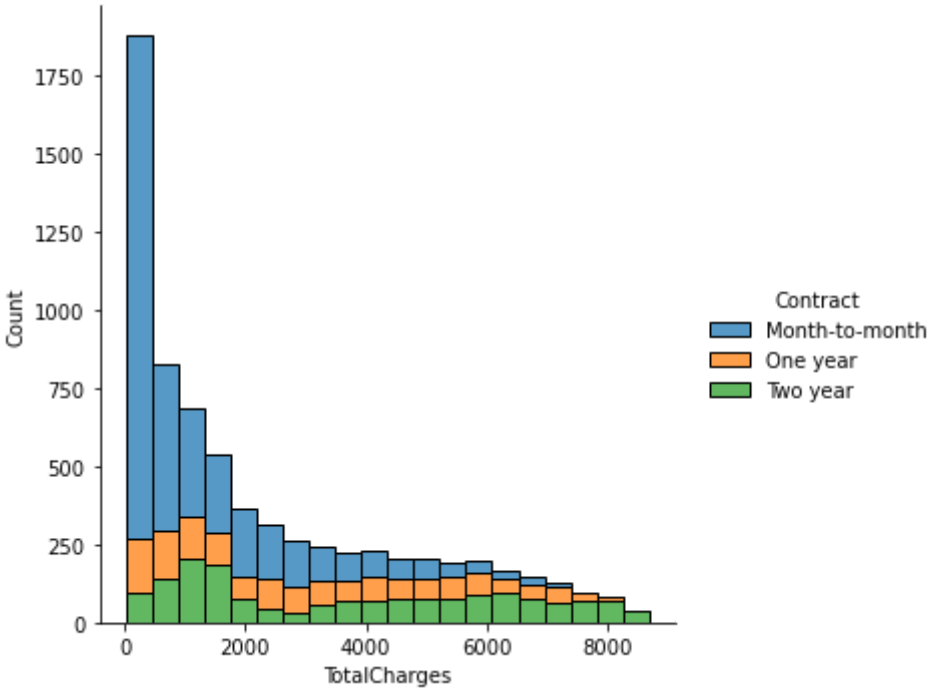
what is our Contract types we provide? - names and ratio please-

In [18]:

```
sns.displot(data, x="TotalCharges", bins=20,hue="Contract", multiple="stack")
```

Out[18]:

```
<seaborn.axisgrid.FacetGrid at 0x1e4e3f17460>
```



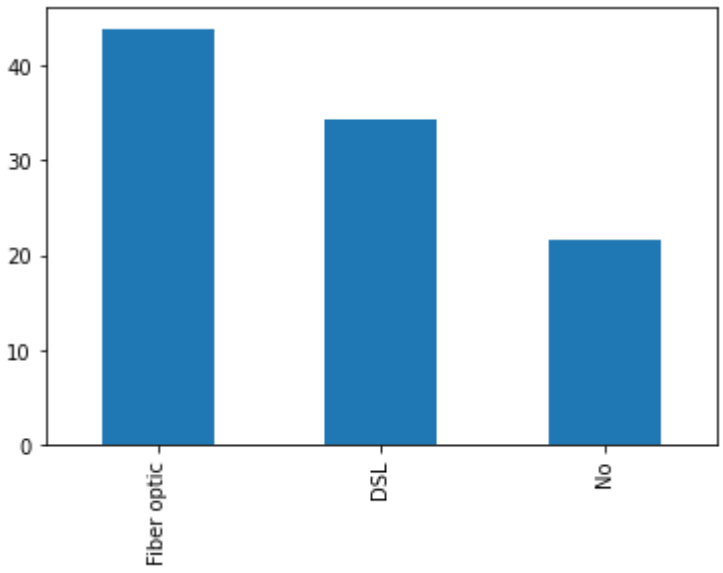
how many Internet Services we provide in our company? - list names and ratio please

In [21]:

```
round(data['InternetService'].value_counts()/data.shape[0]*100,2).plot.bar()
```

Out[21]:

```
<AxesSubplot:>
```



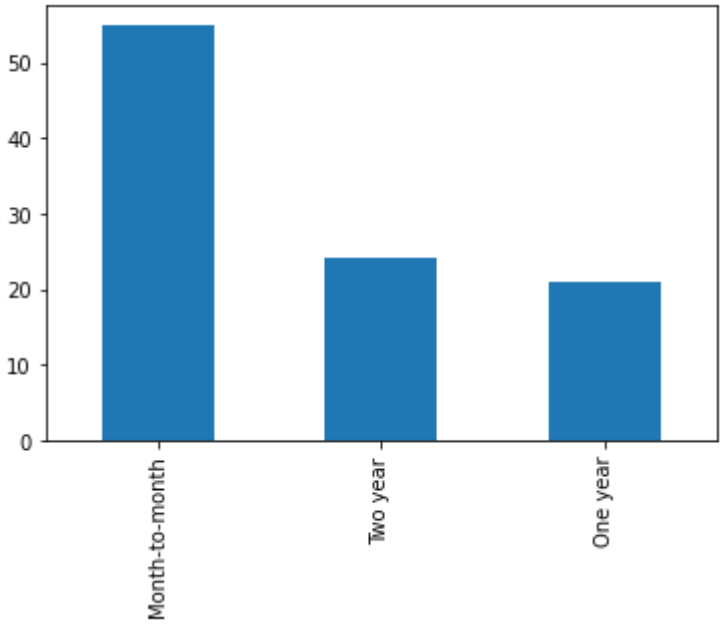
- what is our Contract types we provide? - names and ratio please

In [22]:

```
round(data['Contract'].value_counts()/data.shape[0]*100,2).plot.()
```

Out[22]:

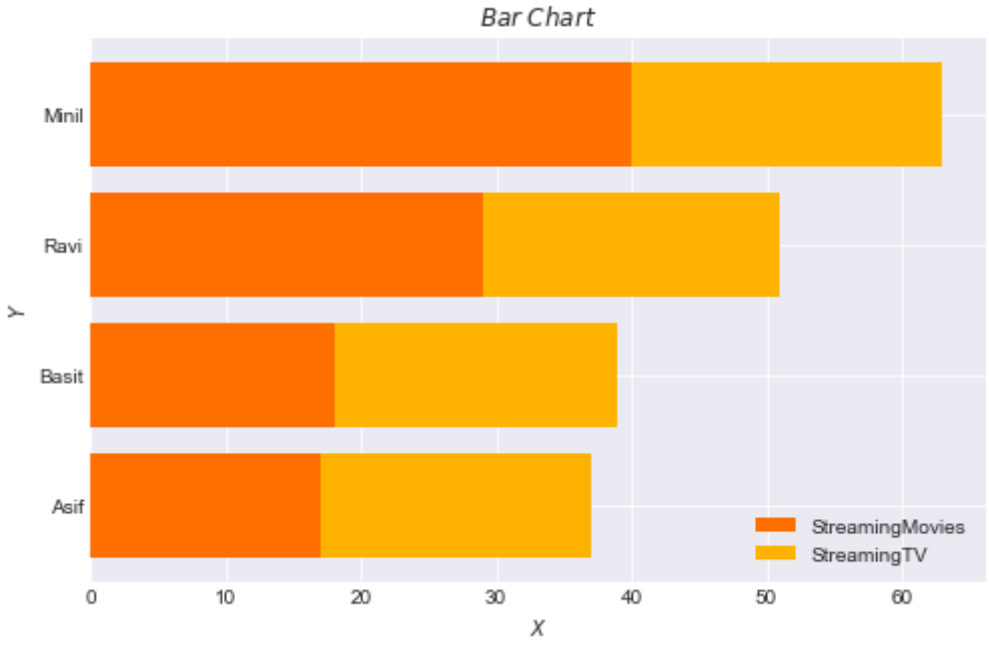
<AxesSubplot:>



what is the ratio between users who streaming movies to StreamingTV subscribers?

In [23]:

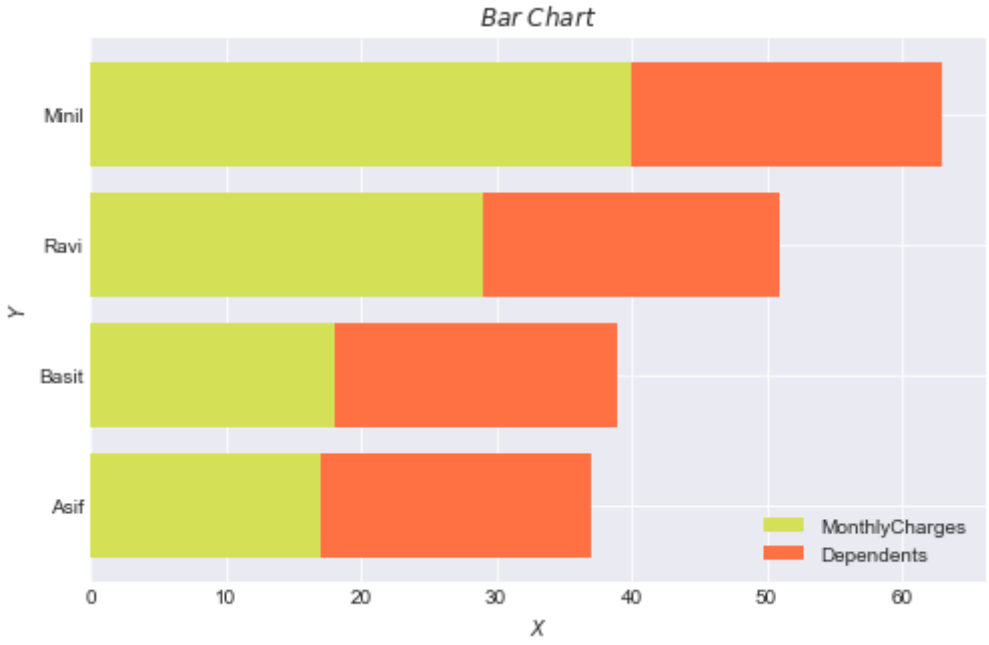
```
plt.style.use('seaborn-darkgrid')
x1= ['Asif','Basit','Ravi','Minil']
y1= [17,18,29,40]
y2 = [20,21,22,23]
plt.figure(figsize=(8,5))
plt.barh(x1,y1,label = "StreamingMovies",color = '#FF6F00')
plt.barh(x1,y2,label = "StreamingTV", left = y1 , color = '#FFB300')
plt.xlabel('$X$')
plt.ylabel('$Y$')
plt.title ('$Bar $ $ Chart$')
plt.legend()
plt.show()
```



Is there a strong relationship between the monthly recharge rate and the dependents?

In [28]:

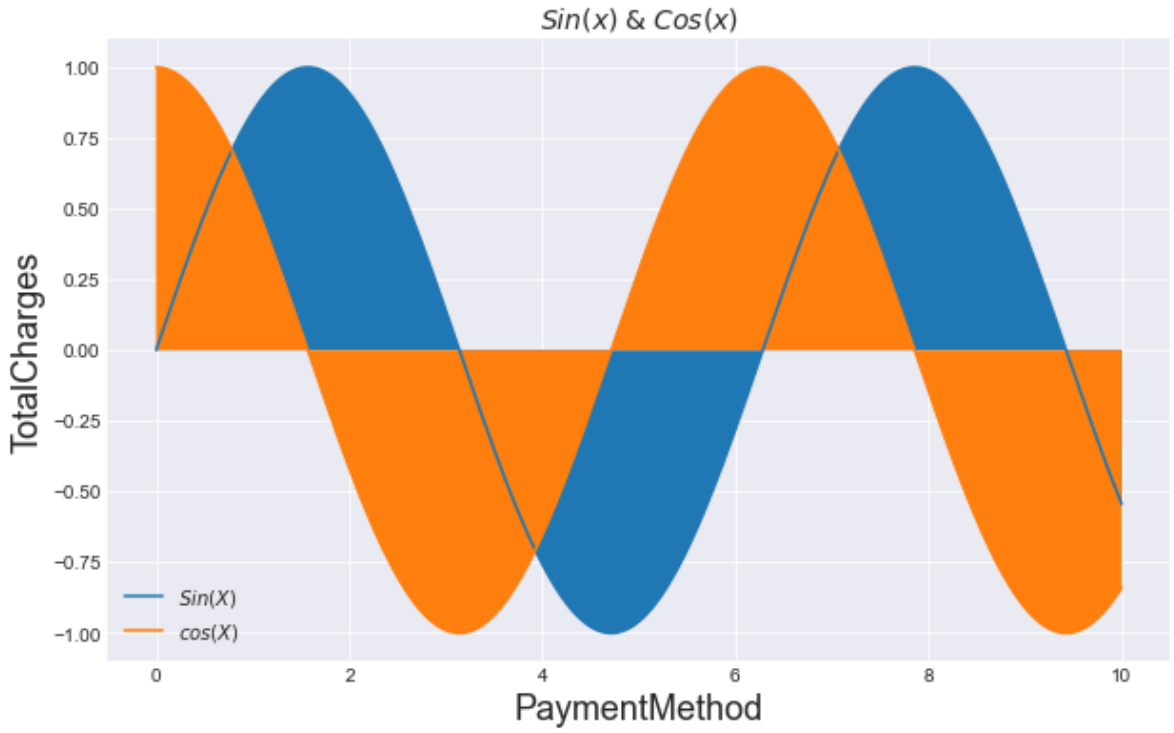
```
plt.style.use('seaborn-darkgrid')
x1= ['Asif','Basit','Ravi','Minil']
y1= [17,18,29,40]
y2 = [20,21,22,23]
plt.figure(figsize=(8,5))
plt.barh(x1,y1,label = "MonthlyCharges",color = '#D4E157')
plt.barh(x1,y2,label = "Dependents", left = y1 , color = '#FF7043')
plt.xlabel('$X$')
plt.ylabel('$Y$')
plt.title ('$Bar $ $ Chart$')
plt.legend()
plt.show()
```



how many payment methods we provide? and what is the ratio between each others?

In [44]:

```
# Shading Regions with fill_between() function
x = np.linspace(0, 10, 2000)
plt.figure(figsize=(10,6))
plt.plot(x,np.sin(x) , label = '$Sin(X)$')
plt.plot(x,np.cos(x) , label = '$cos(X)$')
plt.fill_between(x,0,np.sin(x))
plt.fill_between(x,0,np.cos(x))
plt.xlabel(r'PaymentMethod' , fontsize = 18)
plt.ylabel(r'TotalCharges' , fontsize = 18)
plt.title("$Sin(x) $ $ & $ $ Cos(x)$" ,fontsize = 14)
plt.legend(loc = 'lower left') # Legend will be placed at lower left position
plt.show()
```



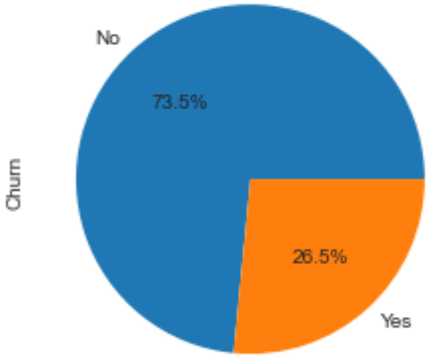
what is our churn rate?

In [46]:

```
round(data['Churn'].value_counts()/data.shape[0]*100,2).plot.pie(autopct='%1.1f%%')
```

Out[46]:

```
<AxesSubplot:ylabel='Churn'>
```



what is the average monthly charge?

In [49]:

```
data['MonthlyCharges'].mean()
```

Out[49]:

```
64.76169246059922
```

In [54]:

```
data['MonthlyCharges'].median()
```

Out[54]:

```
70.35
```

From the correlation matrix ,What is the relationship between the Senior Citizens and theb monthly charging rate?

In [55]:

```
plt.figure(figsize=(10,5))
x = np.linspace(0, 10, 40)
y = np.sin(x) # Sine Graph
plt.plot(x,y,'rv')
plt.xlabel("MonthlyCharges")
plt.ylabel("SeniorCitizen")
plt.show()
```

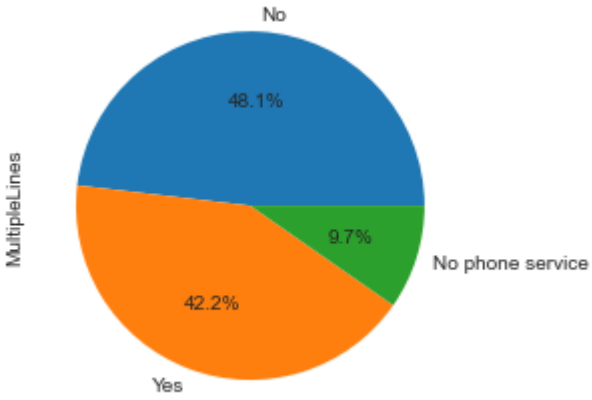
what is the ratio between who has MultipleLines and not in our company?

In [56]:

```
round(data['MultipleLines'].value_counts()/data.shape[0]*100,2).plot.pie(autopct='%1.1f%%')
```

Out[56]:

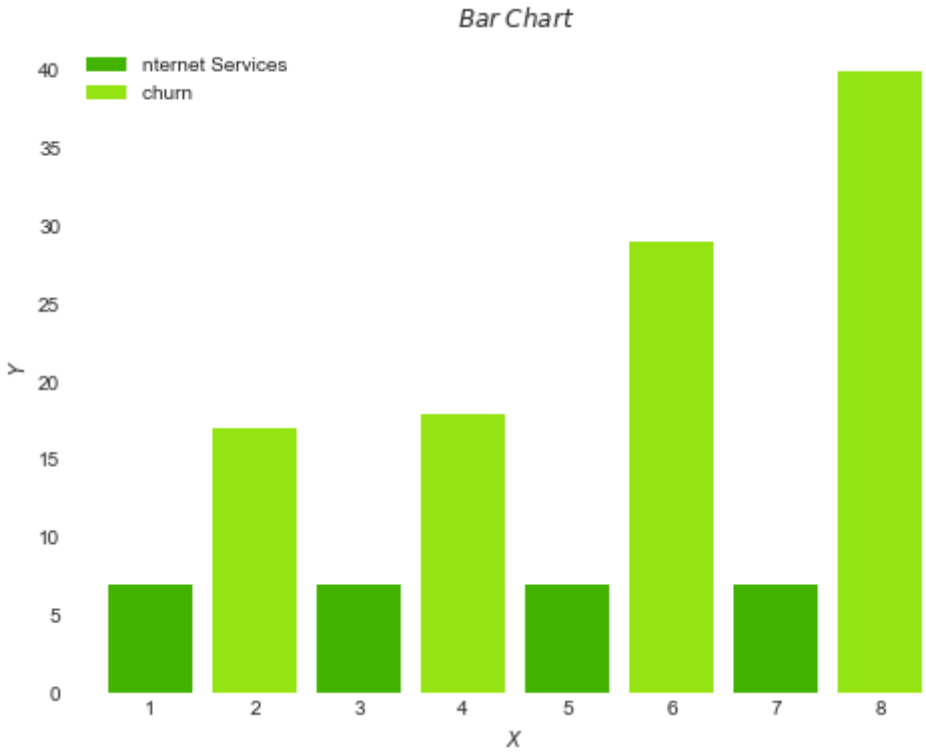
```
<AxesSubplot:ylabel='MultipleLines'>
```



- From the previous question,What is the relationship between the Internet Services and the churn rate?

In [58]:

```
x1= [1,3,5,7]
x2=[2,4,6,8]
y1 = [7,7,7,7]
y2= [17,18,29,40]
plt.figure(figsize=(8,6))
ax = plt.axes()
ax.set_facecolor("white")
plt.bar(x1,y1,label = "nternet Services",color = '#42B300') # First set of data
plt.bar(x2,y2,label = "churn ",color = '#94E413') # Second set of data
plt.xlabel('$X$')
plt.ylabel('$Y$')
plt.title ('$Bar $ $ Chart$')
plt.legend()
plt.show()
```



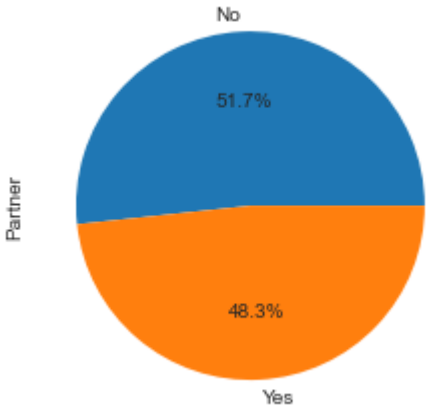
what is the ratio between who has partners and not in our company?

In [65]:

```
round(data['Partner'].value_counts()/data.shape[0]*100,2).plot.pie(autopct='%1.1f%%')
```

Out[65]:

```
<AxesSubplot:ylabel='Partner'>
```



In [ ]:

```

```