In [1]:
```
from sqlalchemy import create_engine
engine = create_engine('sqlite:///C:/Users/sebas/sqlite3/lahmansbaseballdb.sqlite')
connection = engine.connect()

from sqlalchemy import MetaData, Table
metadata = MetaData()

people = Table('people', metadata, autoload=True, autoload_with=engine)

batting = Table('batting', metadata, autoload=True, autoload_with=engine)


from sqlalchemy import case, cast, func, select, extract, Date, and_, Boolean, or_

stmt = select ([(people.columns.finalGame).label('activePlayerasof'), people.columns.nameFirst, people.columns.nameLast,
                people.columns.birthYear, people.columns.birthMonth, people.columns.birthCountry, people.columns.birthState,
                people.columns.birthCity, people.columns.weight,people.columns.height, people.columns.bats,
                people.columns.throws, batting])

stmt = stmt.where(people.columns.finalGame >= '2019')

##stmt = stmt.where(and_(people.columns.finalGame >= '2019',
                ##case([(batting.columns.stint == 1, batting.columns.G>= 50)],
                    ##else_= batting.columns.G >= 50)))

##stmt = stmt.where(and_(people.columns.finalGame >= '2019',
                ##case([(batting.columns.stint == 1, batting.columns.G>= 50)],
                    ##else_= batting.columns.G)))

stmt_joined = stmt.select_from(people.join(batting, people.columns.playerID == batting.columns.playerID))
stmt_grouped = stmt_joined.group_by(batting.columns.yearID, batting.columns.playerID, batting.columns.stint)
##stmt_grouped = stmt_grouped.order_by(func.sum(batting.columns.G))
##stmt_grouped = stmt_joined.group_by(batting.columns.yearID, batting.columns.playerID, batting.columns.teamID)
##stmt_grouped = stmt_joined.group_by(batting.columns.G)


results = connection.execute(stmt_grouped).fetchall()
#for record in results:
    #print(record)
```

In [2]:
```
import pandas as pd
import datetime

df = pd.DataFrame(results)

df.columns = results[0].keys()

current_year = datetime.datetime.now().year
df_DD = datetime.datetime.now().year

df["Age"] = df_DD - df['birthYear']

df["name"] = df["nameFirst"].map(str) + ' ' + df["nameLast"].map(str)

df = df.drop(columns=['nameFirst', 'nameLast', 'birthYear', 'birthMonth', 'birthCountry', 'birthState',
                      'birthMonth','birthCity'])


#df = df.dropna()

#df.isna()

print(df.shape)

df_re = df.set_index(["name","Age","playerID","activePlayerasof","yearID","stint"]).sort_index()
print(df_re.loc[:, "lgID":"G"])

#print(df_re)
```

```
(7257, 32)
                                                        lgID   G
name         Age playerID  activePlayerasof yearID stint
A. J. Cole   28  coleaj01  2019-08-07       2015   1       NL   3
                                            2016   1       NL   8
                                            2017   1       NL  11
                                            2018   1       NL   4
                                                   2       AL  28
...                                                       ...  ..
Zack Greinke 37  greinza01 2019-09-25       2018   1       NL  34
                                            2019   1       NL  26
                                                   2       AL  10
Zack Littell 25  litteza01 2019-09-28       2018   1       AL   8
                                            2019   1       AL  29

[7257 rows x 2 columns]
```

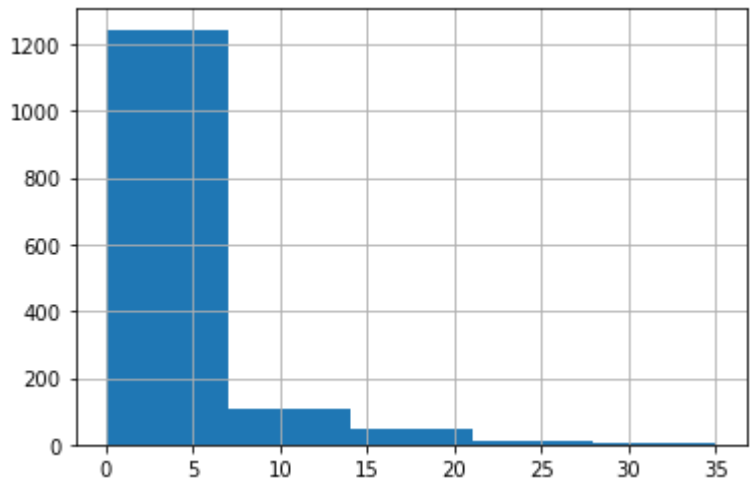
In [3]:
```
import numpy as np
df_rbi = df.pivot_table("RBI", index="yearID", columns = "name")

df_rbi_lc = df_rbi.loc["2015":"2018"].sum(axis = "index")

#df_rbi_lc = df_rbi_lc.replace(0, np.nan)

#df_rbi_lc = df_rbi_lc.dropna(how='all', axis=0)


## Active player who had most runs batted in (RBI) from 2015-2018
print(df_rbi_lc.idxmax())
print(df_rbi_lc.max())
```

```
Nolan Arenado
503.0
```

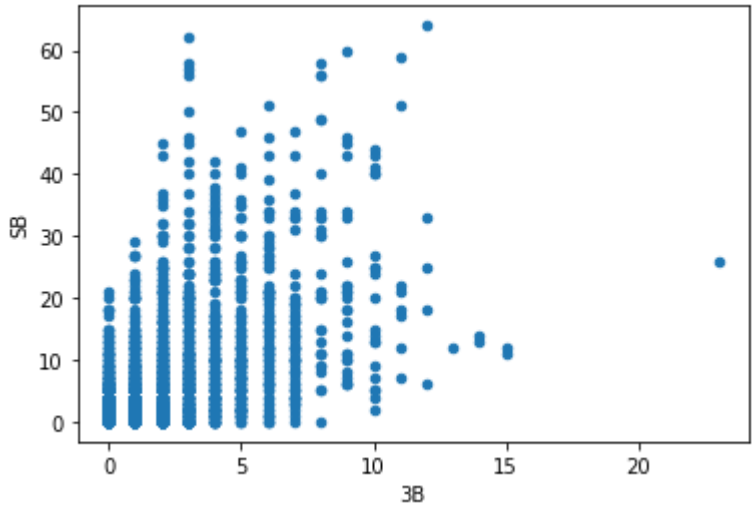
In [4]:
```
df_gidp = df.pivot_table("GIDP", index="yearID", columns = "name")

df_gidp_lc = df_gidp.loc["2016": "2017" ]

print(df_gidp_lc['Albert Pujols'])

##Albert Pujols had palyed 24 double plays gorund into GIDP in 2016
```

```
yearID
2016    24.0
2017    26.0
Name: Albert Pujols, dtype: float64
```

In [5]:
```
import matplotlib.pyplot as plt
#Histogram of triples (3B) per year

df_3B = df.pivot_table("3B", index="yearID", columns = "name")

df_3B_lc = df_3B.loc["2015":"2018"].sum(axis = "index")

df_3B_lc.hist(bins=5)
plt.show()
```



In [6]:
```
#Scatter Plot Relating triples (3B) and steals (SB)
df.plot(x="3B", y="SB",kind="scatter")
plt.show()
```



In [8]:
```
## Additional Question # 1 - Number of Active Players who used to be both hand
s batting (Count "B" in the column 'bats')

df_count = df.groupby('bats').size()
print(df_count)
# There are 323 both hands batting players
```

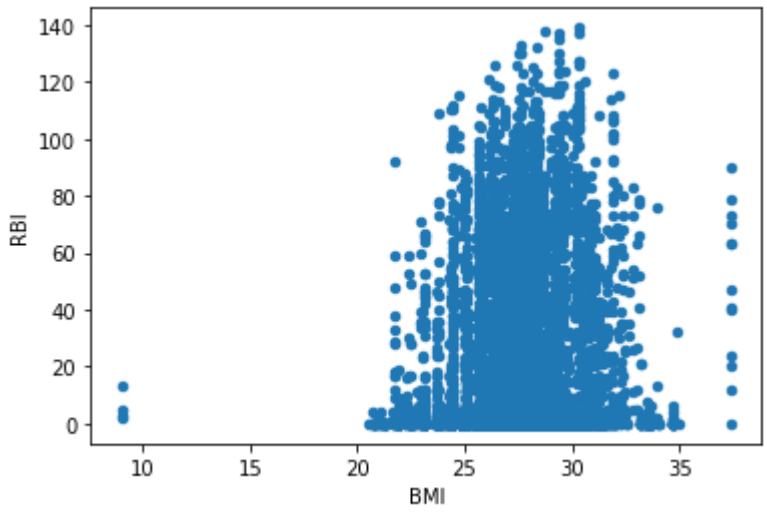
```
bats
B     503
L    2104
R    4650
dtype: int64
```

In [9]:
```
## Additional Question # 2 - The active player who had most doubles (2B) from
 2015-2019
df_2b = df.pivot_table("2B", index="yearID", columns = "name")

df_2b_lc = df_2b.loc["2015":"2019"].sum(axis = "index")

#df_2b_lc = df_2b_lc.replace(0, np.nan)

#df_2b_lc = df_2b_lc.dropna(how='all', axis=0)


## Active player who had most doubles (2B) from 2015-2019
print(df_2b_lc.idxmax())
print(df_2b_lc.max())
```

```
Mookie Betts
217.0
```

In [10]:
```
## Additional Question # 3 - Scatter plot on Body Mass Index (BMI) active players and RBI
## BMI = weight (lb) / [height (in)]2 x 703
df["BMI"] = (df["weight"] / df["height"]**2) * 703
#Scatter on Body Mass Index (BMI) and RBI
df.plot(x="BMI", y="RBI",kind="scatter")
plt.show
```

Out[10]:
```
<function matplotlib.pyplot.show(*args, **kw)>
```



In [11]:
```
#### Additional Question # 4
df_age = df.set_index(["name"]).sort_index()

df_age_lc = df_age.loc[:, "Age"]
print(df_age_lc.max())
print(df_age_lc.idxmax())
# Among The Active Players who is the oldest and the youngest?
print(df_age_lc.min())
print(df_age_lc.idxmin())
```

```
47
Ichiro Suzuki
20
Elvis Luciano
```

In [12]:
```
#### Additional Question # 5 - Stint Statistics
df_count = df.groupby('stint').size()
print(df_count)
```

```
stint
1    6726
2     503
3      26
4       1
5       1
dtype: int64
```

In [13]:
```
#### Additional Question # 6
print(df['playerID'].nunique())
## No of Active players as of 2019
```

```
1410
```

In [14]:
```
#### Additional Question # 7
print(df['name'].nunique())
## 2 Players have the same Name Will Smith with 2 different player IDs - smithwi04 and smithwi05
```

```
1406
```