In [58]:
```
# Vraag 01
# 50 procent van de bags zullen dan niet toegelaten worden
```

```
4.337244875098041
```

In [9]:
```
# Vraag 02
import pandas as pd
diabetes = pd.read_csv('diabetes_data.csv')
```

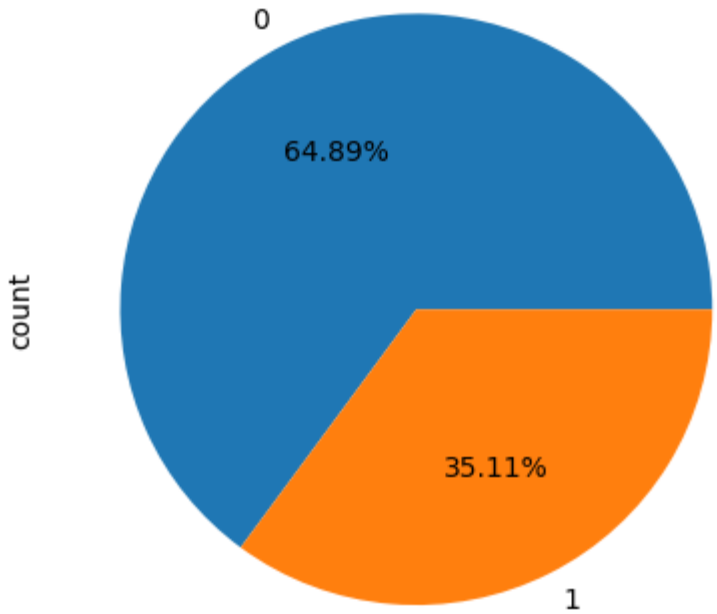
In [10]:
```
# Vraag 02
diabetes.AgeCategory.value_counts()

# 20-30 jaar oud -> 385
```

Out[10]:
```
AgeCategory
20-30    385
30-40    163
40-50    117
50-60     56
60-70     28
70+        3
Name: count, dtype: int64
```

In [16]:
```
# Vraag 03
slp_data_pie = diabetes.Outcome.value_counts()
slp_data_pie.plot(kind = 'pie', autopct='%5.2f%%')
# 0 = geen, 1 = diabetes
```

Out[16]:
```
<Axes: ylabel='count'>
```



In [17]:
```
# Vraag 04
pd.crosstab(diabetes.Glucose, diabetes.AgeCategory)
# gemidelde Glucose op de leeftijd
```

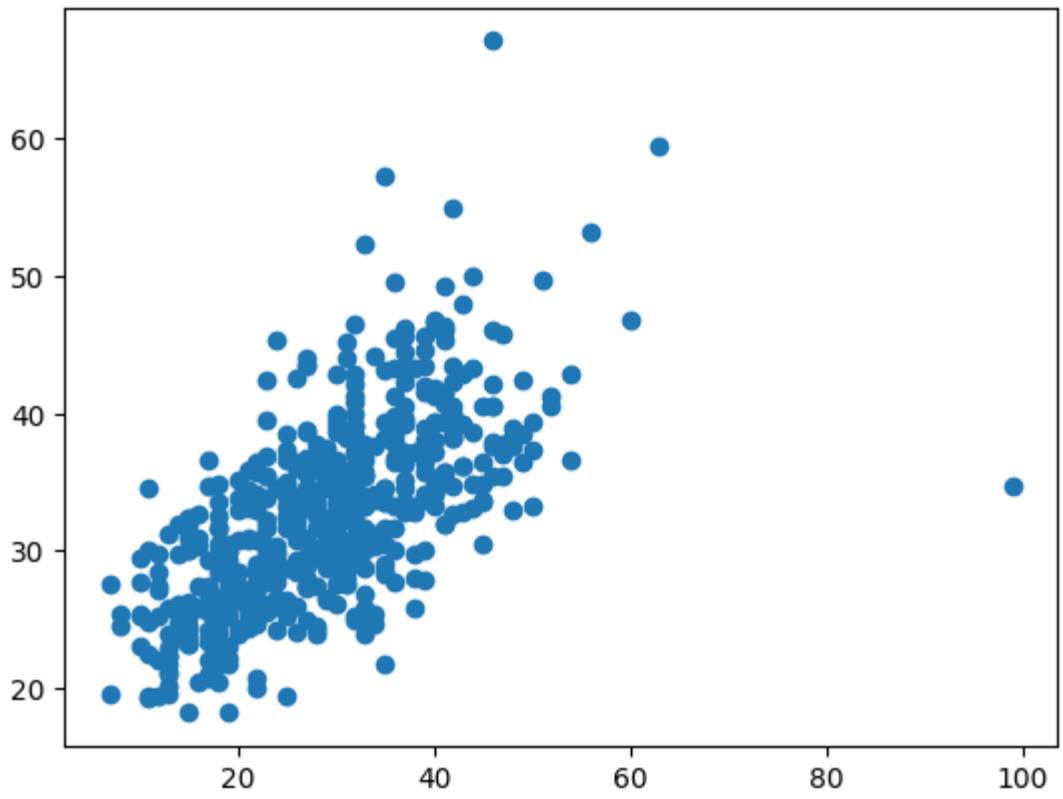
Out[17]:

AgeCategory	20-30	30-40	40-50	50-60	60-70	70+
Glucose						
44.0	0	1	0	0	0	0
56.0	1	0	0	0	0	0
57.0	0	0	1	0	1	0
61.0	0	0	1	0	0	0
62.0	0	0	1	0	0	0
...	...	...	...	...	...	...
195.0	0	1	0	1	0	0
196.0	1	0	1	1	0	0
197.0	0	2	0	1	1	0
198.0	1	0	0	0	0	0
199.0	1	0	0	0	0	0

135 rows × 6 columns

In [22]:
```
# Vraag 05
import matplotlib.pyplot as plt
plt.scatter(diabetes.SkinThickness, diabetes.BMI)
# in de plt.scatter kan je zien hoe deze vaak dicht bij elkaar ligen dussen me
# grotere skinthicness ook het omgekeerde
```

Out[22]:
```
<matplotlib.collections.PathCollection at 0x1b94f29a880>
```



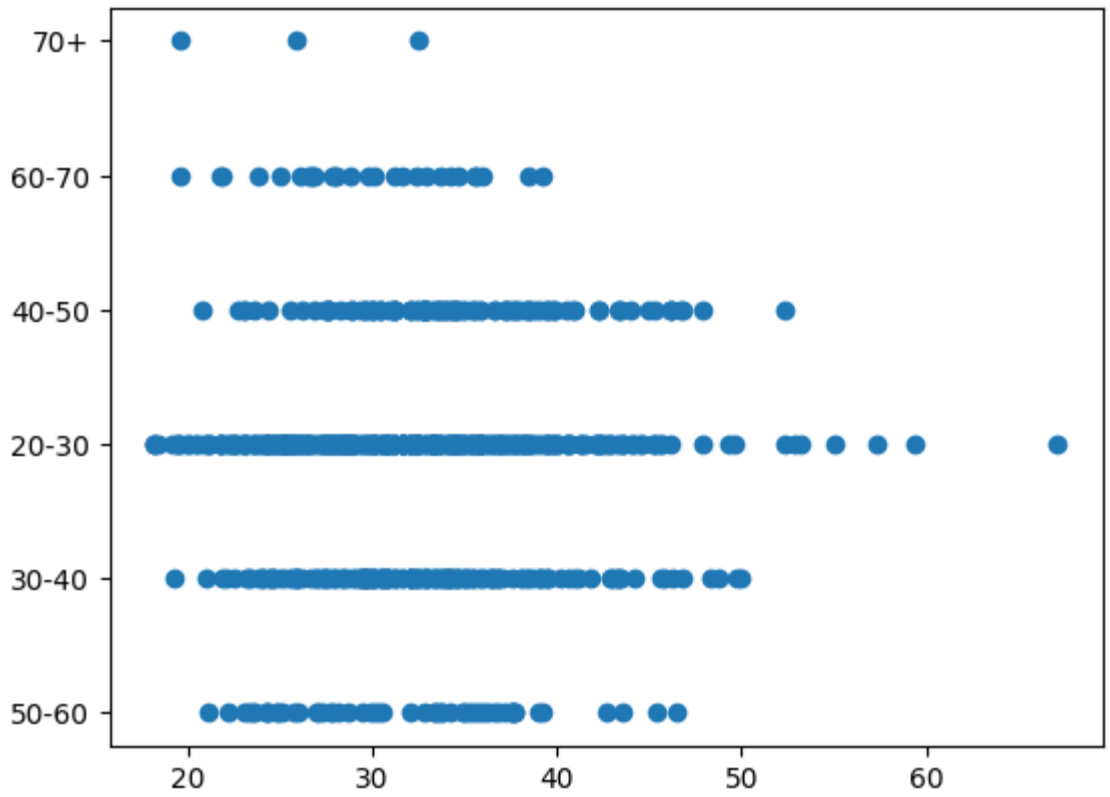
In [29]:
```
# Vraag 06
for col in diabetes.columns:
    if diabetes[col].isna().mean() < 0.05:
        diabetes.dropna(subset={col}, inplace=True)
    elif col in ['Glucose', 'BloodPressure']:
        diabetes.loc[diabetes[col].isna(), col] = -3.36 + 0.99 * diabetes_data
    else:
        diabetes[col].fillna(diabetes[col].median(), inplace=True)

print(diabetes.isna().sum())
# er zijn geen NA waarden meer
```

```
Glucose                   0
BloodPressure             0
SkinThickness             0
Insulin                   0
BMI                       0
DiabetesPedigreeFunction  0
AgeCategory               0
Outcome                   0
dtype: int64
```

In [23]:
```
# Vraag 07
import matplotlib.pyplot as plt
plt.scatter(diabetes.BMI, diabetes.AgeCategory)
# het lijtk er op dat mensen op een jongere leeftijd een hogere bmi zal hebben
```

Out[23]:
```
<matplotlib.collections.PathCollection at 0x1b94f20f430>
```



In [47]:
```
# Vraag 08
#wegschrijven naar een csv bestand
diabetes.to_csv('diabetes_train_df_klaar.csv', index = False)
diabetes_ML = pd.read_csv('diabetes_train_df_klaar.csv')
diabetes_ML = diabetes_ML.drop(['Insulin','SkinThickness', 'BloodPressure'], a
# tabelen droppen die niet relevant zijn voor ML
```

In [48]:
```
# vraag 08
from sklearn.model_selection import train_test_split
X = diabetes_ML.drop('Outcome', axis=1)
y = diabetes_ML['Outcome']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)
# test en training samples maken 80 procent is train 20 test
```

In [49]:
```
# vraag 08
X_train.shape, y_train.shape
```

Out[49]:
```
((579, 4), (579,))
```

In [50]:
```
# vraag 08
X_test.shape, y_test.shape
```

Out[50]:
```
((145, 4), (145,))
```

In [53]:
```
# vraag 08
from sklearn.preprocessing import LabelEncoder

label = LabelEncoder()
X_train['AgeCategory'] = label.fit_transform(X_train['AgeCategory'])
X_test['AgeCategory'] = label.transform(X_test['AgeCategory'])
# zorgen dat er dummy variabelen zijn anders error over convert float
```

In [55]:
```
# vraag 08
from sklearn.linear_model import LogisticRegression
logistic_model = LogisticRegression(penalty= 'l2', solver='liblinear').fit(X_t
y_pred = logistic_model.predict(X_test)
```

In [57]:
```
# vraag 08
from sklearn.metrics import accuracy_score
from sklearn.metrics import precision_score
from sklearn.metrics import recall_score

acc = accuracy_score(y_test, y_pred)
prec = precision_score(y_test, y_pred)
recall = recall_score(y_test, y_pred)

print('accuracy score', acc)
print('precision score', prec)
print('recall score', recall)
```

```
accuracy score 0.8
precision score 0.7058823529411765
recall score 0.5581395348837209
```

In [ ]:
```
# vraag 09 (Bonus)
# hooge likelyhood op diabetes
```