In [12]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [13]:

```
raw_df = pd.read_csv('StudentsPerformance.csv')
df = raw_df.copy()
print(df.shape)
```

```
(1000, 8)
```

In [ ]:

```
df.head()
```

Out[ ]:

	gender	race/ethnicity	parental level of education	lunch	test preparation course	math score	reading score	writing score
0	female	group B	bachelor's degree	standard	none	72	72	74
1	female	group C	some college	standard	completed	69	90	88
2	female	group B	master's degree	standard	none	90	95	93
3	male	group A	associate's degree	free/reduced	none	47	57	44
4	male	group C	some college	standard	none	76	78	75

Инициализируем переменные

In [15]:

```
subjects = ['math score', 'reading score', 'writing score']
categories = ['race/ethnicity', 'parental level of education', 'lunch', 'test preparation course']
pass_score = 40
```

Получим список категорий

In [16]:

```
categories_df = pd.concat(
    (pd.Series(df[col].unique(), name=col) for col in categories), axis=1
)
categories_df
```

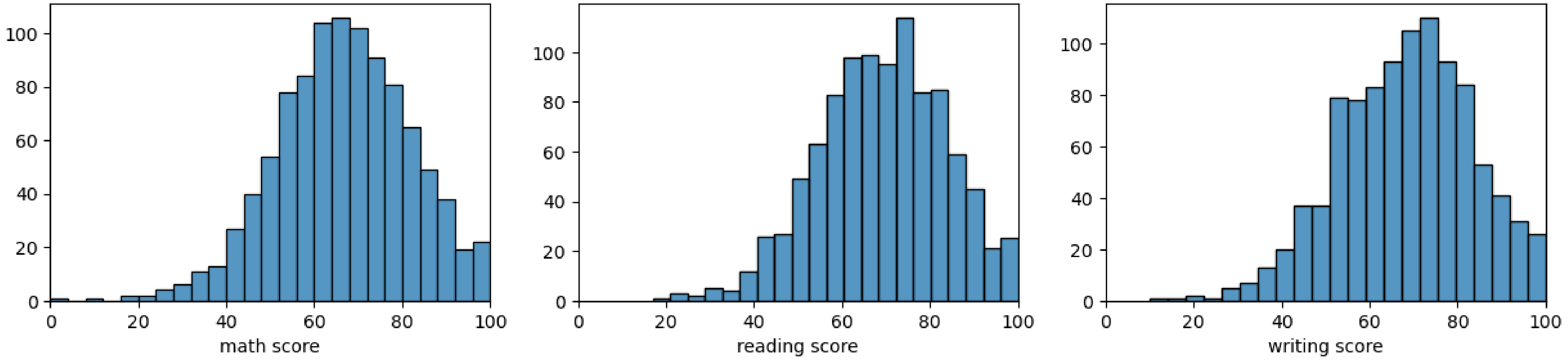
Out[16]:

	race/ethnicity	parental level of education	lunch	test preparation course
0	group B	bachelor's degree	standard	none
1	group C	some college	free/reduced	completed
2	group A	master's degree	NaN	NaN
3	group D	associate's degree	NaN	NaN
4	group E	high school	NaN	NaN
5	NaN	some high school	NaN	NaN

Исследуем распределение результата по разным дисциплинам

In [ ]:

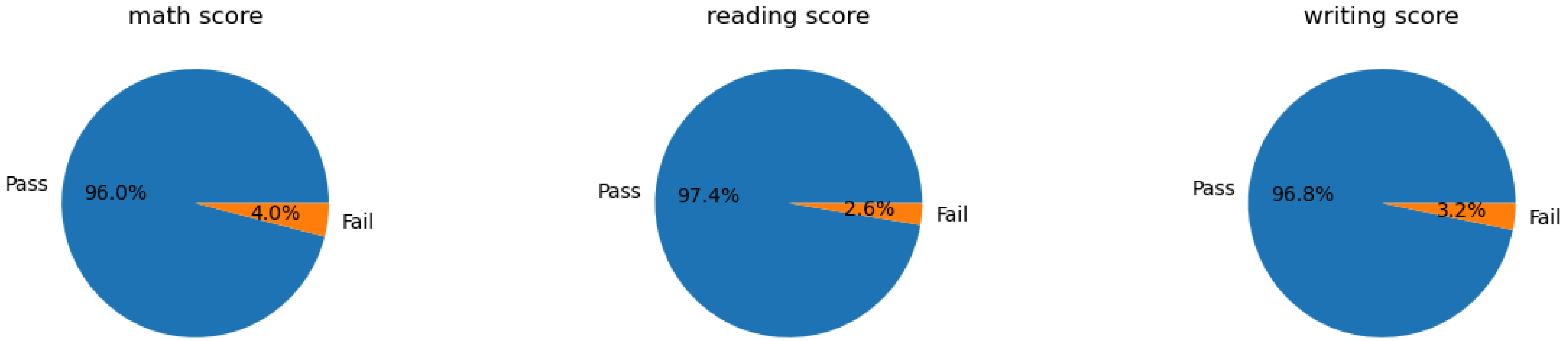
```
fig, ax = plt.subplots(1, 3, figsize=(15, 3))
for i, col in enumerate(subjects):
    sns.histplot(data=df, x=col, ax=ax[i])
    ax[i].set_xlim(0, 100)
    ax[i].set_ylabel('')
```



Узнаем, какая доля студентов сдала экзамен

In [18]:

```
fig, ax = plt.subplots(1, 3, figsize=(15, 3))
for i, col in enumerate(subjects):
    counts = pd.Series(np.where(df[col] >= pass_score, 'Pass', 'Fail')).value_counts()
    ax[i].pie(counts.values, labels=counts.index, autopct='%1.1f%%')
    ax[i].set_title(col)
```



Получим сумму баллов по трем дисциплинам

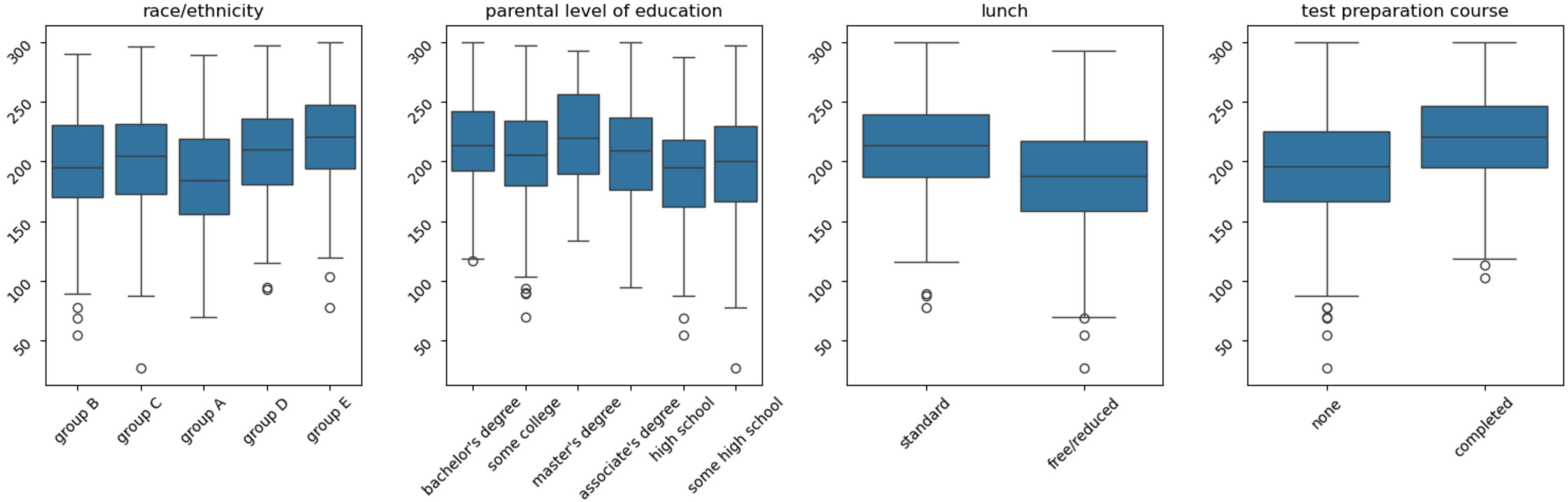
In [19]:

```
df['total score'] = df.loc[:, 'math score':'writing score'].sum(axis='columns')
```

Исследуем диаграммы распределения результата экзаменов по категориям

In [20]:

```
fig, ax = plt.subplots(1, 4, figsize=(15, 5))
ax = ax.flatten()
for i, col in enumerate(categories):
    sns.boxplot(data=df, x=col, y='total score', ax=ax[i])
    ax[i].set_title(col)
    ax[i].set_xlabel('')
    ax[i].set_ylabel('')
    ax[i].tick_params(rotation=45)
plt.tight_layout()
```


race/ethnicity
parental level of education
lunch
test preparation course
300
250
200
150
100
50
group B
group C
group A
group D
group E
bachelor's degree
some college
master's degree
associate's degree
high school
some high school
standard
free/reduced
none
completed