cheg304 hw5 question 1

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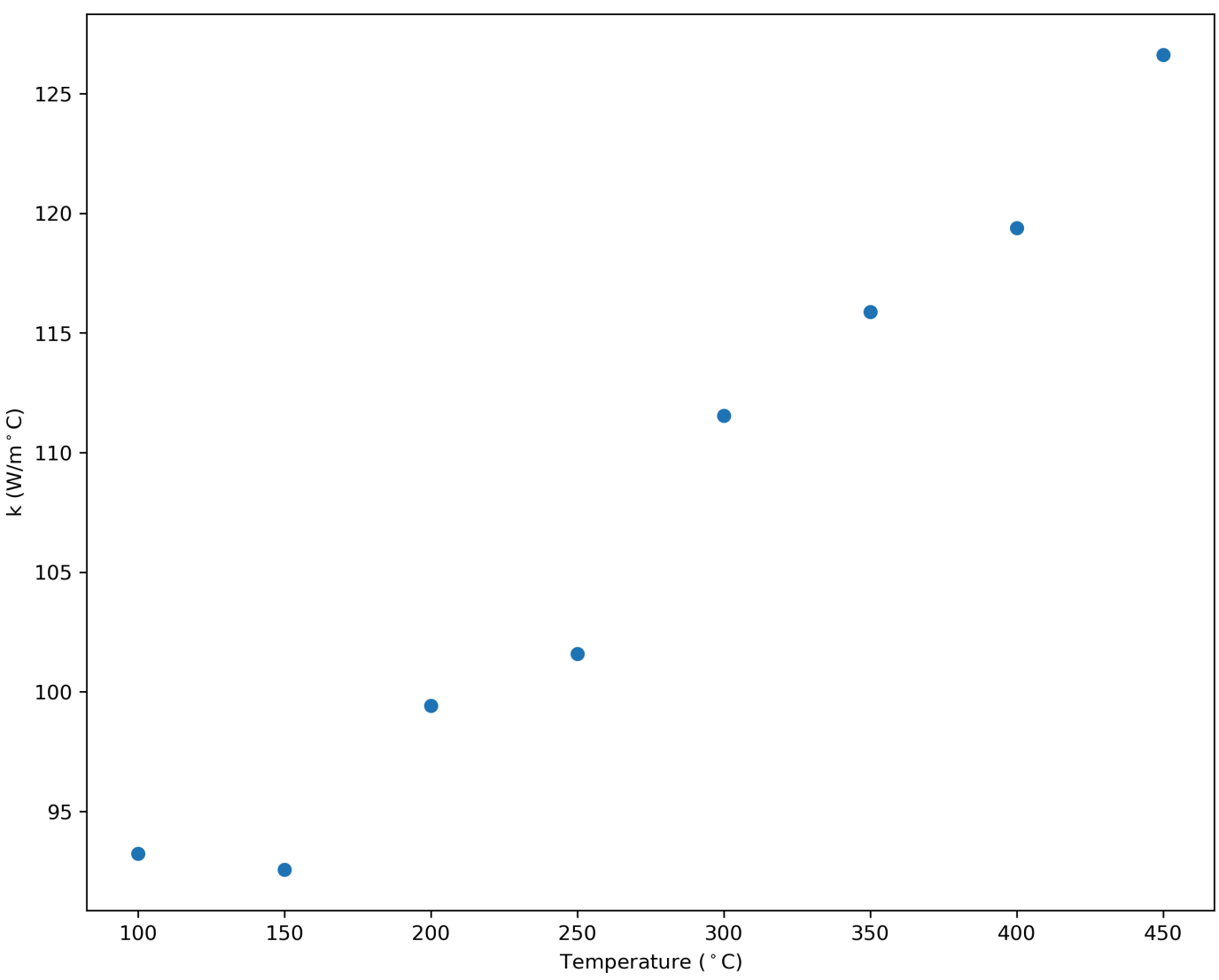
first, we gotta read the data in

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

df = pd.read_csv('dat.tsv', sep=',')
df.head(3)
```

	k	T
0	93.228	100
1	92.563	150
2	99.409	200

the suitable graph for this is the **scatter plot**. this is because we want to have one axis with one variable and another axis with a diferent variable (as goes like the first sentence or two of 12.3.4). also, the next question is asking about if they have a relationship and a scatter plot would help determine if they do.

```
fig,ax = plt.subplots(dpi=300, figsize=(10,8))

ax.scatter(df['T'], df['k'])
ax.set(xlabel='Temperature ($^\circ$C)', ylabel='k (W/m$^\circ$C)')
```



now calculating our r (using the formula from ch16)

```
x = df['T']
y = df['k']

xbar,ybar = x.mean(), y.mean()
numerator = ((x-xbar) * (y-ybar)).sum()
denominator = np.sqrt(((x-xbar)**2).sum())  *  np.sqrt(((y-ybar)**2).sum())
r = numerator / denominator
print(f'r: {r:.4f}')
```

```
r: 0.9847
```

the sign (positive) suggests a positive correlation i.e. as temperature increases so does k. the magnitude says that this relationship is quite strong and fairly linear.

```
#filler
```