Exercise 1: Write a function that computes the level of output generated by a constant returns to scale Cobb-Douglas production function, i.e., such that it computes $A \cdot K^{\alpha} \cdot L^{1-\alpha}$.

In [1]:
```
# Exercise 1:
def cobbdouglas(K=1, L=1, A=1, alpha=0.3):
    y = A* (K**alpha) * (L**(1-alpha))
    return y
print(cobbdouglas(4,9,2,0.5))
#12.0
```

```
12.0
```

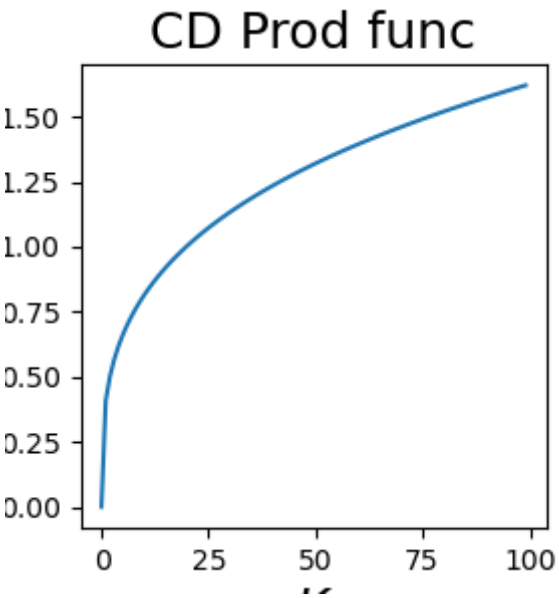
Exercise 2: Use the function you created and plot the production function as a function of K for given values of A and L. **Hint:** Use the `np.linspace(0, 5, 100)` function to create an array of values of K with 100 point between 0 and 5.

In [27]:
```
# Exercise 2:
import numpy as np
import matplotlib as mpl
import matplotlib.pyplot as plt
%matplotlib widget

K = np.linspace(0,5,100)
i=0
while i in K:
    cobbdouglas(K[i])
    i += 1
    break
fig, CD = plt.subplots(figsize=(3,3))
CD.plot(cobbdouglas(K))
CD.label=(r'$y=A*(K**alpha)*(L**(1-alpha))$')
CD.set_xlabel(r'$K$', fontsize=18)
CD.set_ylabel(r'Y', fontsize=18)
CD.set_title(r'CD Prod func', fontsize=18)
```

Out[27]:
```
Text(0.5, 1.0, 'CD Prod func')
```

Figure



Exercise 3: Show with a plot the effect of increasing A from 1 to 2, 4, or 5.

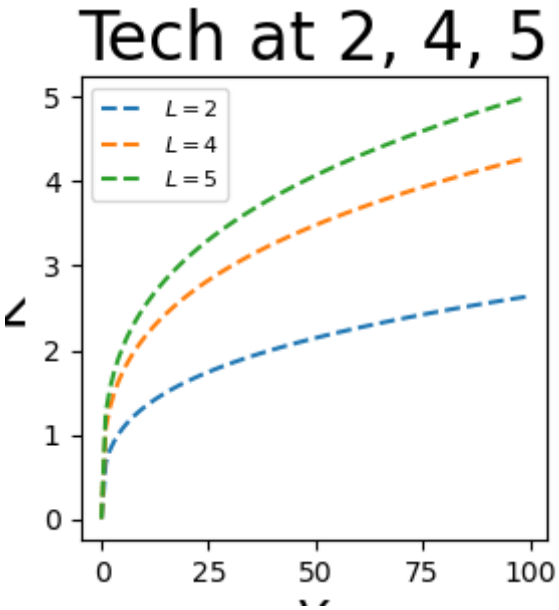
In [28]:
```
# Exercise 3:
fig, A = plt.subplots(figsize=(3,3))

A.plot(cobbdouglas(K,2), linestyle='--', label=r'$L=2$')
A.plot(cobbdouglas(K,4), linestyle='--', label=r'$L=4$')
A.plot(cobbdouglas(K,5), linestyle='--', label=r'$L=5$')
A.set_title(r'Tech at 2, 4, 5', fontsize=24)
A.set_xlabel(r'$Y$', fontsize=18)
A.set_ylabel(r'K', fontsize=18)

plt.legend(fontsize=8)
```

Out[28]:
```
<matplotlib.legend.Legend at 0x16a4e7cd0>
```

Figure



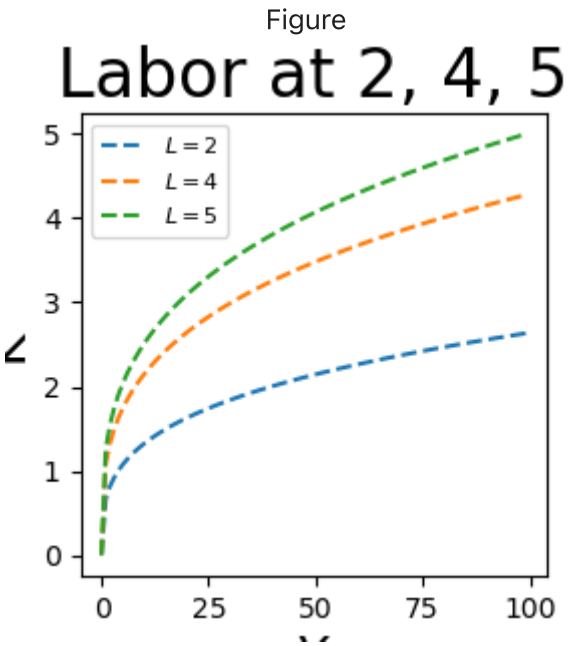
Exercise 4: Show with a plot the effect of increasing L from 1 to 2, 4, 5.

In [29]:
```
# Exercise 4:
fig, L = plt.subplots(figsize=(3,3))

L.plot(cobbdouglas(K,2), linestyle='--', label=r'$L=2$')
L.plot(cobbdouglas(K,4), linestyle='--', label=r'$L=4$')
L.plot(cobbdouglas(K,5), linestyle='--', label=r'$L=5$')
L.set_title(r'Labor at 2, 4, 5', fontsize=24)
L.set_xlabel(r'$Y$', fontsize=18)
L.set_ylabel(r'K', fontsize=18)

plt.legend(fontsize=8)
```

Out[29]:
```
<matplotlib.legend.Legend at 0x16a4a32e0>
```



Exercise 5: Save the previous plots into **png, jpeg, and pdf** files.

In [5]:
```
# Exercise 5:
plt.savefig('./pics/cobbdouglas.png')
plt.savefig('./pics/cobbdouglas.pdf')
plt.savefig('./pics/cobbdouglas.jpeg')
```