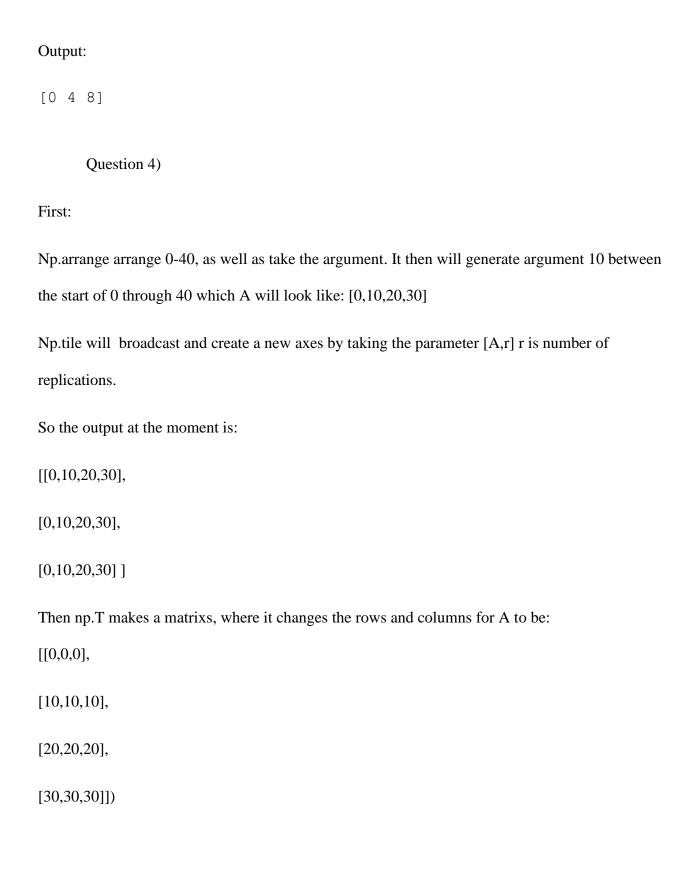
```
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Exam 1
      Question 1)
A)
keys=["a","b","c","d","e","f"]
values=[0,1,2,3,4,5]
diction= dict(zip(keys,values))
print(diction)
Output:
{'a': 0, 'b': 1, 'c': 2, 'd': 3, 'e': 4, 'f': 5}
B)
a) True
b) False
c) False
d) True
e) True
      Question 2)
      A)
```

```
Import math
Def function(x):
       F=2 * math.sin(x) * math.cos(x)
       Return F
Def function_f(x):
       Two_f=2 * (math.cos(x) * math.cos(x) - math.sin(x) * math.sin(x))
       Return Two_f
Def function_ff(x):
       Three_f= -4 * 2 * math.sin(x) * math.cos(x)
       Return Three_f
If x is equal to pi like x=pi
The output would be:
0,2,0
B)
```

When writing the code, need to separate down all square components.

Separating the x's from the polynomial function

```
def polynomial(x):
  return x*(x*(x*(x+2)-25)-26)+120
      Question 3)
   A) The output for import numpy as np B = np.arange(12).reshape((3, 4)) is:
[[ 0 1 2
                3]
 [ 4 5 6 7]
 [ 8 9 10 11]]
      B)
import numpy as np
B = np.arange(12).reshape((3, 4))
sum_col=B.sum(axis=0)
print(sum_col)
Output:
[12 15 18 21]
      C)
import numpy as np
B = np.arange(12).reshape((3, 4))
min_row=B.min(axis=1)
print(min_row)
```



Then into B=np.array([0,1,2]). It using different dimension that A and B do not match for, so it call for broadcasting

```
Output of that be:
*B[[0,1,2],
[0,1,2],
[0,1,2]]
Then last A -B:
[ [ 0,-1,-2],
[10,9,8],
[20,19,18],
[30,29,28]]
       Question 5)
A-D)
class Numbers:
  MULTIPLIER=2
  def __init__(self,x,y):
    self.x=x
    self.y=y
```

```
def add(self):
     return self.x+self.y
  def multiply(self,w):
     return self.MULTIPLIER*w
  def difference(self,a,b):
     return a-b
  def value(self):
     list=[self.x,self.y]
     return tuple(i for i in list)
       Question 6)
   A)
It would print out:
Line 1-5:
Letter # 0 is S
Letter # 1 is n
Letter # 2 is o
Letter # 3 is w
```

Letter # 4 is!

B)

The output would be:

Line 1-4:

X = 4

X = 3

Y = 2

Z = 4