Inches To Miles

A map uses a scale of 1 inch to 25 miles. How many miles are represented by 5 inches on this map?

```
inches = 1
miles = 25
while inches <= 5:
     print ('inches:', inches,'miles:', mil
es)
     inches = inches + 1
     miles = miles + 25
```

Compound Interest Calculator

If you deposit £1,000 in a bank account which is paying 3% compound interest per year. How much interest would be earned over 3 years?

```
numberOfYears = 3
startingAmount = 1000
rateOfInterest = 3 #percent

rateOfInterest = rateOfInterest/100

amount = startingAmount
for year in range(numberOfYears):
    interestOnAmount = (amount * rateOfInt
erest)
    amount = amount + interestOnAmount
    print ("Year", year,"  : Interest : ",
interestOnAmount)

print ("Total amount with interest after",
numberOfYears, " years is ",amount)
```

Compound Interest Calculator - Plot

Plotting the graph between Years and the Interest earned.

```
import matplotlib.pyplot as plt
numberOfYears = 3
startingAmount = 1000
rateOfInterest = 3 #percent
yearlyInterest = []
years = []
yearlyAmount = []
rateOfInterest = rateOfInterest/100
amount = startingAmount
for year in range(numberOfYears):
    years.append(year + 1)
    interestOnAmount = (amount * rateOfInterest)
    yearlyInterest.append(interestOnAmount)
    amount = amount + interestOnAmount
    yearlyAmount.append(amount)
    print ("Year", year,"  : Interest : ",interestOnAmou
nt)
```

Compound Interest Calculator - Plot

```
print ("Total amount with interest after",numberOfYears,
 " years is ",amount)
plt.plot(years,yearlyInterest)
plt.grid(linestyle='-', linewidth='0.5', color='red')
plt.xlabel("Year")
plt.ylabel('Interest')
plt.show()
```

Data Analysis - Pie Chart

```
import matplotlib.pyplot as plt

# Pie chart, where the slices will be ordered a
nd plotted counter-clockwise:
labels = ['Science', 'Technology', 'Engineering
', 'Mathematics']
sizes = [36, 43, 13, 38]
explode = (0, 0.1, 0, 0)  # only "explode" the
2nd slice (i.e. 'Hogs')

fig1, ax1 = plt.subplots()
ax1.pie(sizes, explode=explode, labels=labels,
autopct='%1.1f%%',
        shadow=True, startangle=90)
ax1.axis('equal')  # Equal aspect ratio ensures
 that pie is drawn as a circle.
plt.title("STEM A level subjects that girls pla
n to study")
plt.show()
```

Draw A Square

Using turtle library, draw a square.

```
import turtle

lucy = turtle.Turtle()
lucy.forward(100)
lucy.left(90)
lucy.forward(100)
lucy.left(90)
lucy.forward(100)
lucy.left(90)
lucy.forward(100)
lucy.left(90)
```

Spiral Designs

Draw a spiral design using turtle.

```
import turtle

lucy = turtle.Turtle()
lucy.color("green")
for i in range(350):
    lucy.forward(i)
    lucy.right(98)
```

Pythagoras Theorem

Using Pythagoras Theorem and Angles draw a right-angled triangle.

```
import turtle,math

ab = 100
bc = 200
pointer = turtle.Turtle()
pointer.forward(ab)
pointer.left(90)
pointer.forward(bc)
ca = math.sqrt((ab ** 2) + (bc ** 2))
angle = math.degrees(math.atan(bc / ab))
print (angle)
pointer.left(90+angle)
pointer.forward(ca)
```

Algebraic Expressions

Solve the algebraic expression $x^2y^2+xy^2+xy-2xy^2$ using python.

```
expr = "x ** 2 * y ** 2 + x * y ** 2 + x *
 y - 2 * x * y **2"
x = 2
y = 3
print (eval(expr))
```

Coin Flip Model

Modelling the coin flips and the probability of heads and tails.

```
import random
headcount = 0
tailcount = 0
totaltries = 100
for i in range(totaltries):
    diceroll = random.random()
    if(diceroll <= 0.50):
        print ("trial",i," heads")
        headcount = headcount + 1
    else:
        print("trial",i," tails")
        tailcount = tailcount + 1
print ("Number of heads ",headcount)
print ("Number of tails", tailcount)
print ("Heads %" ,(headcount/
totaltries )* 100)
print ("Tails %" ,(tailcount/
totaltries )* 100)
```

Lottery Game

The national lottery has contacted you to make a new lottery game.
The game will ask the user how many weeks they want to play and for 3 numbers they want to select; First between 1-10, second between 11-20 and third between 21-30.
If they match 1 number they win £10, 2 numbers £500, 3 numbers £1,000,000.

```
from random import randint
numbersMatched = 0

numOfTickets = int(input("How many weeks do you want to play?"))
num1 = int(input("Please enter in your first number (1-10)"))
num2 = int(input("Please enter your second number (11-20)"))
num3 = int(input("Please enter in your final number(21-30)"))
```

Lottery Game

```
for i in range(numOfTickets) :
    winningNum1 = randint(1,10)
    winningNum2 = randint(11,20)
    winningNum3 = randint(21,30)

    print("Week: ", i+1)

    if num1 == winningNum1:
        numbersMatched += 1

    if num2 == winningNum2:
        numbersMatched += 1

    if num3 == winningNum3:
        numbersMatched += 1
```

Lottery Game

```
    print("The winning numbers were: ", wi
nningNum1, winningNum2, winningNum3)
    if numbersMatched == 0:
        print("You won nothing")

    if numbersMatched == 1:
        print("You won £10")

    if numbersMatched == 2:
        print("You won £500")

    if numbersMatched == 3:
        print("Well Done! you won £1,000,0
00")

    numbersMatched = 0
```