

In [ ]:

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import math

def cylinder():
    r = float(input("Enter radius: "))
    h = float(input("Enter height: "))
    print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
    op = int(input("Choose operation: "))
    if op == 1:
        print("CSA =", 2 * math.pi * r * h)
    elif op == 2:
        print("TSA =", 2 * math.pi * r * (r + h))
    elif op == 3:
        print("Volume =", math.pi * r**2 * h)

def cone():
    r = float(input("Enter radius: "))
    h = float(input("Enter height: "))
    l = math.sqrt(r**2 + h**2)
    print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
    op = int(input("Choose operation: "))
    if op == 1:
        print("CSA =", math.pi * r * l)
    elif op == 2:
        print("TSA =", math.pi * r * (r + l))
    elif op == 3:
        print("Volume =", (1/3) * math.pi * r**2 * h)

def cube():
    a = float(input("Enter side length: "))
    print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
    op = int(input("Choose operation: "))
    if op == 1:
        print("CSA =", 4 * a**2)
    elif op == 2:
        print("TSA =", 6 * a**2)
    elif op == 3:
        print("Volume =", a**3)

def cuboid():
    l = float(input("Enter length: "))
    b = float(input("Enter breadth: "))
    h = float(input("Enter height: "))
    print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
    op = int(input("Choose operation: "))
    if op == 1:
        print("CSA =", 2 * h * (l + b))
    elif op == 2:
        print("TSA =", 2 * (l*b + b*h + h*l))
    elif op == 3:
        print("Volume =", l * b * h)

def sphere():
    r = float(input("Enter radius: "))
    print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
    op = int(input("Choose operation: "))
    if op == 1 or op == 2:
        print("Surface Area =", 4 * math.pi * r**2)
    elif op == 3:
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        print("Volume =", (4/3) * math.pi * r**3)

def main():
    print("Choose a shape:")
    print("1. Cylinder\n2. Cone\n3. Cube\n4. Cuboid\n5. Sphere")
    choice = int(input("Enter your choice: "))
    if choice == 1:
        cylinder()
    elif choice == 2:
        cone()
    elif choice == 3:
        cube()
    elif choice == 4:
        cuboid()
    elif choice == 5:
        sphere()
    else:
        print("Invalid choice")

main()

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Choose a shape:

- 1. Cylinder
- 2. Cone
- 3. Cube
- 4. Cuboid
- 5. Sphere

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In [1]: import math

class Cylinder:
    def __init__(self, radius, height):
        self.r = radius
        self.h = height

    def csa(self):
        return 2 * math.pi * self.r * self.h

    def tsa(self):
        return 2 * math.pi * self.r * (self.r + self.h)

    def volume(self):
        return math.pi * self.r**2 * self.h

class Cone:
    def __init__(self, radius, height):
        self.r = radius
        self.h = height
        self.l = math.sqrt(radius**2 + height**2)

    def csa(self):
        return math.pi * self.r * self.l

    def tsa(self):
        return math.pi * self.r * (self.r + self.l)

    def volume(self):
        return (1/3) * math.pi * self.r**2 * self.h

class Cube:
    def __init__(self, side):
        self.a = side

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def csa(self):
    return 4 * self.a**2

def tsa(self):
    return 6 * self.a**2

def volume(self):
    return self.a**3

class Cuboid:
    def __init__(self, length, breadth, height):
        self.l = length
        self.b = breadth
        self.h = height

    def csa(self):
        return 2 * self.h * (self.l + self.b)

    def tsa(self):
        return 2 * (self.l*self.b + self.b*self.h + self.h*self.l)

    def volume(self):
        return self.l * self.b * self.h

class Sphere:
    def __init__(self, radius):
        self.r = radius

    def csa(self):
        return 4 * math.pi * self.r**2

    def tsa(self):
        return 4 * math.pi * self.r**2

    def volume(self):
        return (4/3) * math.pi * self.r**3

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In [2]:

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print("Choose a shape:")
print("1. Cylinder\n2. Cone\n3. Cube\n4. Cuboid\n5. Sphere")
choice = int(input("Enter your choice: "))

print("Choose operation:")
print("1. Curved Surface Area\n2. Total Surface Area\n3. Volume")
op = int(input("Enter your choice: "))

if choice == 1:
    r = float(input("Radius: "))
    h = float(input("Height: "))
    shape = Cylinder(r, h)
elif choice == 2:
    r = float(input("Radius: "))
    h = float(input("Height: "))
    shape = Cone(r, h)
elif choice == 3:
    a = float(input("Side: "))
    shape = Cube(a)
elif choice == 4:
    l = float(input("Length: "))
    b = float(input("Breadth: "))
    h = float(input("Height: "))

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shape = Cuboid(l, b, h)
elif choice == 5:
    r = float(input("Radius: "))
    shape = Sphere(r)
else:
    print("Invalid shape")
    exit()

if op == 1:
    print("CSA =", shape.csa())
elif op == 2:
    print("TSA =", shape.tsa())
elif op == 3:
    print("Volume =", shape.volume())
else:
    print("Invalid operation")
```

Choose a shape:

- 1. Cylinder
- 2. Cone
- 3. Cube
- 4. Cuboid
- 5. Sphere

Choose operation:

- 1. Curved Surface Area
- 2. Total Surface Area
- 3. Volume

TSA = 942.4777960769379

In [ ]: