1. interface Shape

{

public final static double pi=3.14;

public double perimeter();

public double area();

}

class Circle implements Shape

{

double r;

Circle(double rad){r=rad;}

public double perimeter(){return(2\*pi\*r);}

public double area(){

return(pi\*r\*r);

}

}

class Ellipse implements Shape

{

double a,b;

Ellipse(double a,double b){this.a=a;this.b=b;}

public double perimeter(){return(2\*pi\*Math.sqrt((a\*a)+(b\*b)))\*0.5;}

public double area(){

return(pi\*a\*b);

}

}

public class Test

{

public static void main(String args[])

{

Circle c=new Circle(4.5);

Ellipse e=new Ellipse(3,6);

Shape s=c;

System.out.println("perimeter of circle ="+s.perimeter());

System.out.println("area of circle ="+s.area());

s=e;

System.out.println("perimeter of ellipse="+s.perimeter());

System.out.println("area of ellipse ="+s.area());

}

}

**Output :**

**perimeter of circle =28.26**

**area of circle =63.585**

**perimeter of ellipse=21.06376034804802**

**area of ellipse =56.519999999999996**

**[Program finished]**

2. class Vechile

{

int capacity;

float consumption;

float distance;

Vechile(int c,float consume,float d)

{

capacity=c;

consumption=consume;

distance=d;

}

}

class Car extends Vechile

{

Car(int c,float con,float d)

{

super(c,con,d);

}

float computeDistance()

{

float d=(capacity\*100f)/consumption;

return d;

}

float computeFuel(int d)

{

return d/this.distance;

}

}

class Truck extends Vechile

{

Truck(int c,float con,float d)

{

super(c,con,d);

}

float computeDistance()

{

float d=(capacity\*100f)/consumption;

return d;

}

float computeFuel(int d)

{

return d/this.distance;

}

}

public class Test

{

public static void main(String args[])

{

Car c=new Car(40,10,500);

Truck t=new Truck(10,20,300);

System.out.println("distance covered on full tank ="+c.computeDistance());

System.out.println("no of filling required ="+c.computeFuel(1400));

System.out.println("distance covered on full tank ="+t.computeDistance());

System.out.println("no of filling required ="+t.computeFuel(1400));

}

}

**Output :**

**distance covered on full tank =400.0**

**no of filling required =2.8**

**distance covered on full tank =50.0**

**no of filling required =4.6666665**

3.class Student

{

int regno;

String name, dept;

Student(int rno, String name, String dept)

{

regno = rno; this.name=name; this.dept =dept;

}

void display()

{

System.out.print(regno + " "+ name + " "+ dept);

}

}

class Test extends Student

{

int marks[];

Test(int r, String n, String d, int m[])

{

super(r,n,d);

marks = m;

}

}

class Result extends Test

{

Result(int r, String n, String d, int m[])

{

super(r,n,d,m);

}

void printResult() {

display();

int sum = 0;

for (int i =0; i< marks.length; i++)

sum += marks[i];

System.out.println(" Total Marks: "+ sum + " Average = " + (sum/5.0) );

}

}

public class TestMain

{

public static void main(String arg[])

{

int mark[]= {67,89,98,76,87};

Result r = new Result(4174, "Manoj", "CSE", mark);

r.printResult();

int mark2[] = {86,98,76,89,77};

Result r2 = new Result(4175,”Sandeep", "CSE", mark2);

r2.printResult();

}

}

**Output**:

4174 Manoj CSE Total Marks: 417 Average = 83.4

4175 Sandeep CSE Total Marks: 426 Average = 85.2