English Name: _____

Worksheet: class Line

Given the following class Coordinate:

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1  public class Coordinate {
2      private final double x;
3      private final double y;
4      static final Coordinate origin = new Coordinate(0,0);
5      public Coordinate(double x, double y) {
6          this.x = x;
7          this.y = y;
8      }
9      public double distance(double x, double y) {
10         return Math.sqrt( Math.pow(this.x – x, 2) + Math.pow(this.y – y, 2) );
11     }
12     public double distance(Coordinate c) {
13         return distance(c.x, c.y);
14     }
15     public double getX() {
16         return x;
17     }
18     public double getY() {
19         return y;
20     }
21     public boolean equals(Coordinate c) {
22         if(c == null) return false;
23         if(this == c) return true;
24         return Math.abs(this.x - c.x) < 1e-12 && Math.abs(this.y - c.y) < 1e-12;
25     }
26  }
```

Write class Line that has:
- Two private fields, p1 and p2, each a Coordinate object, that represent the two endpoints of the Line object.
- A constructor that takes two Coordinate objects as parameters to set fields p1 and p2.
- A constructor that takes four parameters, x1, y1, x2, and y2, and uses these to create two Coordinate objects, one using x1 and y1, the other using x2 and y2. These objects are then stored in the fields p1 and p2 of the Line object.
- A method named length that determines the length of the Line object by calling the Coordinate method distance on the endpoints (p1 and p2) of the Line object.
- A method named slope that calculates the slope of the Line object, returning Double.NaN if the line is vertical.
- A method named midpoint that returns a Coordinate object that is at the midpoint of the Line object.
- A method named equals that takes one parameter, a Line object, and returns true if the two endpoints are the same as the current Line object (this). The Line objects are considered equal if the two endpoints are the same regardless of which order the endpoints are in. You must use the equals method from the Coordinate class to determine equality of Coordinate objects.