CS312 Quiz - Inheritance and Polymorphism Behavior

Name: _____ UTEID _____

Consider the following classes:

```
public class Tower {
    private int height;

    public Tower(int h) { height = h; }

    public int getSize() { return height / 2; }

    public void improve() { height += 2; }

    public String toString() { return "h: " + height; }
}

public class ArrowTower extends Tower {

    public ArrowTower(int h) { super(h); }

    public void improve() {
        super.improve();
        super.improve();
    }
}

public class BallistaTower extends ArrowTower {

    public BallistaTower() { super(10); }

    public String toString() { return "size: " + getSize(); }
}

public class CannonTower extends Tower {

    private int shotWeight;

    public CannonTower(int sw) {
        super(6);
        shotWeight = sw;
    }

    public int getSize() { return shotWeight / 10; }

    public int getCharge() { return shotWeight / 5; }

    public String toString() {
           return super.toString() + ", " + shotWeight;
    }
} // ANSWER THE QUESTIONS ON THE BACK
```

Consider each of the following statements. For each indicate if it compiles or not.

```
Tower t1 = new ArrowTower();

Tower t2 = new ArrowTower(10);

ArrowTower t3 = new Tower(10);

CannonTower t4 = new ArrowTower(10);

Object t5 = new CannonTower(10);

Tower t6 = new Object();

Tower t7 = new Object(10);

Tower t8 = new BallistaTower();

ArrowTower t9 = new BallistaTower();

BallistaTower t10 = new ArrowTower(10);
```

What is output by the following code?

```
BallistaTower t11 = new BallistaTower();
System.out.println(t11);

ArrowTower t12 = new ArrowTower(7);
System.out.println(t12);

Tower t13 = new CannonTower(20);
System.out.println(t13);

Tower t14 = new ArrowTower(10);
t14.improve();
t14.improve();
System.out.println(t14);

Tower t15 = new CannonTower(50);
t15.improve();
System.out.println(t15.getSize());

CannonTower t16 = new CannonTower(50);
t16.improve();
System.out.println(t16.getSize());
```