3 Object-Oriented Programming (RKH)

Consider the following Java class.

```
1 public class Child extends Parent {
2    public int x=0;
3
4    public boolean equals(Object obj) {
5        if (this == obj) return true;
6        if (!super.equals(obj)) return false;
7        if (getClass() != obj.getClass())
8            return false;
9            Child other = (Child) obj;
10           if (x != other.x) return false;
11           return true;
12    }
13 }
14 }
```

(a) Explain why it is bad practice for member variables such as `x` to be `public`. [2 marks]

(b) For each of the lines 6–12, explain its purpose. Illustrate your answer with examples. [7 marks]

(c) What could result from a call to `c.equals(null)`, assuming `c` is a reference to a `Child` object? [3 marks]

(d) What would be the consequences of replacing the `equals` signature with `public boolean equals(Child obj)`? [4 marks]

(e) Explain why `Child` should also override the `hashCode()` method. [4 marks]