1 Exercises

Problem 1. Implement the `Circle` data type from Problem 2 of Section 3.1, along with a suitable client `_main()` that tests all the methods in the API.

2 Solutions to Exercises

Solution 1.

Circle

```
import math

class Circle:
    def __init__(self, h = 0.0, k = 0.0, r = 1.0):
        self._h = h
        self._k = k
        self._r = r

    def area(self):
        return math.pi * self._r ** 2

    def contains(self, x, y):
        return (x - self._h) ** 2 + (y - self._k) ** 2 <= self._r ** 2

    def __lt__(self, other):
        return self.area() < other.area()

    def __eq__(self, other):
        return self._h == other._h and self._k == other._k and \
            self._r == other._r

    def __str__(self):
        return '(' + str(self._h) + ', ' + str(self._k) + ', ' + \
            str(self._r) + ')'

def _main():
    import stdio

    c1 = Circle(1.0, 1.0, 2.0)
    c2 = Circle()
    stdio.writeln(c1.area())
    stdio.writeln(c1.contains(1.2, 2.2))
    stdio.writeln(c1 < c2)
    stdio.writeln(c1 == Circle(r = 2.0, h = 1.0, k = 1.0))
    stdio.writeln(c1)

if __name__ == '__main__':
    _main()
```