HOMEWORK ASSIGNMENT 4

SIYUAN YAO, ZHENGFEI CHEN, KAI YAN

(1) Problem A

(a) Since ducd wants to find the density at the value x, it with solved original function $f_x(x)$ with given value:
$ducd(x, c) = \frac{3}{2 \cdot (c^{1.5} - 1)} \cdot x^{0.5}$

(b) pucd wants to find the cdf at value in q, which means it want to find the Fx(x), which is the integral of the fx(x).
$pucd(q, c) = \int_1^q \frac{3}{2 \cdot (c^{1.5} - 1)} \cdot x^{0.5} dx = \frac{q^{1.5}}{c^{1.5} - 1} - \frac{1^{1.5}}{c^{1.5} - 1} = \frac{q^{1.5} - 1}{c^{1.5} - 1}$

(c) qucd wants to find the quantiles at the values of q. This means it will get want to find the inverse of cdf function.
$qucd(q, c) = (q \cdot (c^{1.5} - 1) + 1)^{\frac{2}{3}}$

(d) In rucd, we want to generate n random values. So, we use runif to generate n random values and use qucd to convert it into a value of quantile.

```
rucd <- function(n,c) {
        tmp <- runif(n);
        qucd(tmp,c);
};
```