HOMEWORK ASSIGNMENT 4

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(1) Problem A

Since ducd wants to find the density at the value x, it with solved original function $f_x(x)$ with given value:

$$ducd(x, c) = \frac{3}{2 \cdot (c^{1.5} - 1)} \cdot x^{0.5}$$

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).

$$pucd(q, c) = \int_1^q \frac{3}{2 \cdot (c^{1.5} - 1)} \cdot x^{0.5} dx = \frac{q^{1.5}}{c^{1.5} - 1} - \frac{1^{1.5}}{c^{1.5} - 1} = \frac{q^{1.5} - 1}{c^{1.5} - 1}$$

qucd wants to find the quantiles at the values of q. This means it will get want to find the inverse of cdf function.

$$qucd(q, c) = (q \cdot (c^{1.5} - 1) + 1)^{\frac{2}{3}}$$

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);
};
```