Q2:

integration $F_1 = \int_0^1 x^3 = \frac{x^4}{3}\Big|_0^1 = \frac{1}{3}$

$F_2 = \int 1 = x$

$U \sim$ uniform $(0,1)$

if $U < \frac{1}{3}$

invert F_1

solve $U = \frac{x^4}{3}$, with $3U = x^4$

$x = (3u)^{-4}$

else

invert method for F_2

$U = x$