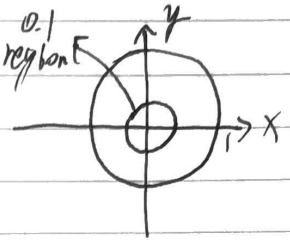
2. (a) The unit circle is



Consider P(having an accurate estimator x) = 1 - P (all $\|x_i\| > 0.1$)
If we have a x_i that's $\|x_i\| \leq 1$, then
$P(\|x_i\| \leq 0.1) = \frac{B(0,0.1)}{B(0,1)} = \frac{(0.1)^d}{1}$ with d = dimension.

So P(x is accurate) = 1 - P(all $\|x_i\| > 0.1$)
$= 1 - ((1-(0.1)^d)^n)$.

(b) If dimension increases, $(1-(0.1)^d)^n \to 1$, then
P(x is accurate) $\to 0$.
To bound the P of accurate x, we need
$1 - ((1-(0.1)^d)^n) > c$ with c being some constant.
$(1-(0.1)^d)^n < 1-c$.

~~$n \log_{1-(0.1)^d}(1-c)$~~

$n > \log_{1-(0.1)^d}(1-c)$.