

ENGR 0020

Spring 2019

Quiz 6

February 21, 2019

Time Limit: 10 Minutes

Name (Print): _____

Recitation Section: — (A 9:00-10:50, B 13:00-14:50)

Teaching Assistant: Shaoning Han

This quiz contains 1 page and 1 problem. You can use textbooks, notes and calculators, but *no* discussions. Use the backside of the paper if needed.

1. (10 points) The weight of a large number of miniature poodles are approximately normally distributed with a mean of 8 kilograms and a standard deviation of 0.9 kilogram. If measurements are recorded to the nearest tenth of a kilogram, given that the fraction of these poodles with weights between 8 and w kilograms is 0.2, find w . We assume $w > 8$.

Solution: Let random variable X be the weight of a poodle and we have

$$\mathbb{P}(8 \leq X \leq w) = 0.2.$$

Let $Z = (X - 8)/0.9$, then Z is a standard normal variable. We have

$$\begin{aligned}\mathbb{P}(8 \leq X \leq w) &= \mathbb{P}(0 \leq Z \leq (w - 8)/0.9) \\ &= \mathbb{P}(Z \leq (w - 8)/0.9) - \mathbb{P}(Z \geq 0) \\ &= \mathbb{P}(Z \leq (w - 8)/0.9) - 0.5 \\ &= 0.2,\end{aligned}$$

which implies $\mathbb{P}(Z \leq (w - 8)/0.9) = 0.7$. By using the table, we find

$$\frac{w - 8}{0.9} = 0.52,$$

i.e. $w \approx 8.5$.