

Quiz 6

ECEn 370

Name: _____ Key _____

1. The average height for adult Dutch males is 72.05 inches, or 6.0 ft. (the U.S. average is 69.7 inches (5' 9.7")). Netherlands is the tallest nation in the world, surpassing the U.S. in the 1950s. Dr. Jeffs' 18 year old son is 82 inches tall (6' 10"). Assume that height is distributed Normal in this population with a standard deviation of 3.53 inches (this is approximately correct). What is the probability that a random person his son meets in the Netherlands will be taller than him?

Let X be the height of the person Dr. Jeffs' son meets and let $z = (82 - \mu)/\sigma = (82 - 72.05)/3.53 = 2.82$.

This is the mapping of the son's height onto a standard normal distribution.

$$P[X > 82] = 1/2 - \text{erf}(z).$$

From Table 2.4-1 we find using linear interpolation that $\text{erf}(z) = (0.2)/(0.5)(0.49780 - .49743) + 0.49743 = 0.49758$, so

$$P[X > 82] = 0.0024, \text{ or only 2.4 out of 1000 will be taller.}$$

Note that during 2004-2005 on sabbatical in the Netherlands, Dr. Jeffs met on average two people per day taller than him (not counting his son). This would be unusual in the U.S., but the Netherlands is officially the tallest country in the world.