Mathematics 1550H – Introduction to probability
TRENT UNIVERSITY, Winter 2018

Assignment # 9
The bell curve strikes again!
Due on Friday, 23 March.

A random variable X has a *normal distribution with mean μ and standard deviation σ* if it has as its density function

$$\varphi(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-(x-\mu)^2/2\sigma^2}.$$

1. Show that $E(X) = \mu$. *[5]*

2. Show that $\sigma = \sqrt{V(X)}$. *[5]*

Sing me a song of the hydrogen light
Three degrees Kelvin illumine the night
Three degrees Kelvin, the infrared sky
Colors too deep for the unaided eye

Sing me a song of the hydrogen band
Whispering low since the cosmos began
Whispering low as the white light shifts red
Wavefronts of hydrogen sweeping ahead

Sing me a song of the hydrogen wall
Vector me out to that light bounding all
Vector me out in that glory to dwell
End of the universe, cosmic eggshell.

By John M. Ford, from his novel *Princes of the Air*.