Exam II
Administered: Monday, October 15, 2018
28 points

For each problem part: 0 points if not attempted or no work shown,
1 point for partial credit, if work is shown,
2 points for correct numerical value of solution

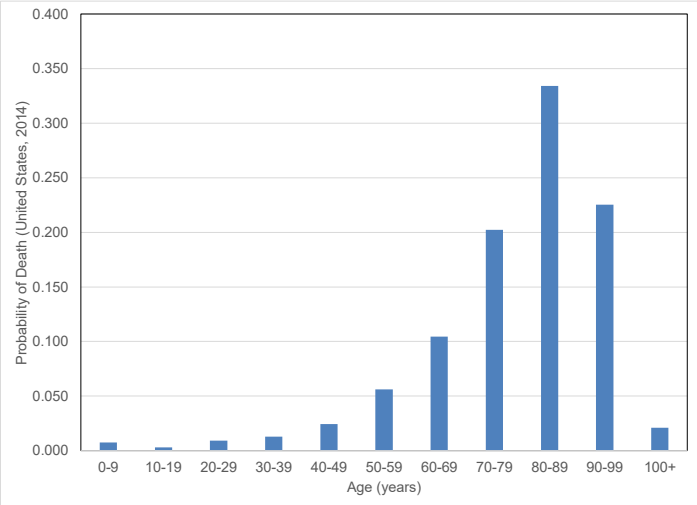
Problem 1. (20 points)
Consider the following data is provided for the enthalpy of fusion of octane, taken from the NIST Chemistry Webbook, http://webbook.nist.gov/chemistry/.

Enthalpy of fusion of Octane (C_8H_{18})

$\Delta_{fus}H$ (kJ/mol)	Temperature (K)	Reference
20.740	216.38	Finke, Gross, et al., 1954
21.8	216.6	Mondieig, Rajabalee, et al., 2004
20.74	216.4	Domalski and Hearing, 1996
20.652	215.8	Huffman, Parks, et al., 1931
20.092	215.6	Parks, Huffman, et al., 1930

Perform the following tasks.
(a) Determine the sample mean of the enthalpy of fusion of octane.
(b) Determine the sample variance of the enthalpy of fusion of octane.
(c) Determine the sample standard deviation of the enthalpy of fusion of octane.
(d) Identify the appropriate distribution to describe the mean of the enthalpy of fusion of octane in this case.
(e) Determine the lower limit of a 95% confidence interval on the mean of the enthalpy of fusion of octane.
(f) Determine the upper limit of a 95% confidence interval on the mean of the enthalpy of fusion of octane.
(g) Identify the appropriate distribution to describe the variance of the enthalpy of fusion of octakJne in this case.
(h) Determine the lower limit of a 95% confidence interval on the variance of the enthalpy of fusion of octane.
(i) Determine the upper limit of a 95% confidence interval on the variance of the enthalpy of fusion of octane.
(j) Explain your findings in parts (a) through (i) in language a non-statistician can understand.

Problem 2. (8 points)
A histogram describing life expectancy in the United States by decade, as of 2014, is provided in the plot and tables below. In both the plot and table, the probability of death in a given decade is provided.



Age	pdf	cdf
0-9	0.007356	0.007356
10-19	0.002937	0.010294
20-29	0.009040	0.019334
30-39	0.0128931	0.032227
40-49	0.0244972	0.056724
50-59	0.0559906	0.112714
60-69	0.1044818	0.217196
70-79	0.2023472	0.419543
80-89	0.334033	0.753576
90-99	0.225315	0.978891
100+	0.0211088	1.000000

(a) Is this a discrete or continuous pdf?
(b) What is the probability that an individual dies in their twenties?
(c) What is the probability that an individual lives into their seventies or beyond?
(d) Assuming that their lifetimes are independent, what is the probability that four siblings all live to their seventies or beyond?