1. National unemployment data from July of 1995 through January of 1996 (as supplied by the United States Department of Labor) may be modeled by the function $E(m) = 0.025m^2 - 0.481m + 7.854$ percent where m is the end of the month of the year (*i.e.*, $m = 1$ at the end of January 1995, 2 at the end of February 1995,...13 at the end of January 1996, etc.).

   National unemployment from July of 1995 through January of 1996 was changing at the rate given by $e(m) = 0.05m - 0.481$ percent per month where m is the month of the year (*i.e.*, $m = 1$ at the end of January 1995, $m = 2$ at the end of February 1995, ,...13 at the end of January 1996, etc.).

   For each question, show the notation that you evaluate and include units with your answer.

a. **Using *E(m)*, find the change in unemployment** between August 1995 and January 1996.

b. **Using *e(m)*, find the change in unemployment** between August 1995 and January 1996.

c. **Using *E(m)*, find the average rate of change of unemployment** between August 1995 and January 1996.

d. **Using *e(m)*, find the average rate of change of unemployment** between August 1995 and January 1996.

e. **Using *E(m)*, find the average unemployment** between August 1995 and January 1996.

f. When was the unemployment equal to the average unemployment between August 1995 and January 1996? Give your answer correct to 3 decimal places before rounding in the context of the problem.

2. The data below gives the number of female US Army personnel on active duty that served as warrant officers for selected years between 1944 and 2000.

Year	1944	1950	1960	1985	1994	1998	2000
Female Warrant Officers	10	22	39	288	535	661	781

a. Align the input data to the number of years after 1940 and fit an exponential function to the data. Call the function $f(x)$ and write a completely defined model.

b. Find and interpret $\frac{f(50)-f(15)}{50-15}$.

c. Find and interpret $\frac{\int_{15}^{50} f(x)dx}{50-15}$.

d. Without finding $f'(x)$, explain what $\frac{\int_{15}^{50} f'(x)dx}{50-15}$ calculates.