8. [6 points] Suppose that $\int_{-3}^{8} f(x)dx = 5$. Use this information to determine the values for the constants a, b, and k that you are certain will satisfy the definite integral $\int_{a}^{b} kf(2x)dx = 5$. Write your answers on the spaces provided. You do not need to show your work for this problem.

$$a = -1.5$$
 $b = -4$ $k = -2$

9. [6 points] Suppose f(x) = f'(x) + 3. Determine the EXACT value of $\int_0^1 e^x f'(x) dx$ given that f(0) = 1 and f(1) = 4. Be sure to show enough work to support your answer.

Solution: We use integration by parts, letting $u = e^x$ and dv = f'(x)dx so that $du = e^x dx$ and v = f(x). Then we have

$$\int_{0}^{1} e^{x} f'(x) dx = e^{x} f(x) |_{0}^{1} - \int_{0}^{1} e^{x} f(x) dx$$

$$= ef(1) - f(0) - \int_{0}^{1} e^{x} (f'(x) + 3) dx$$

$$= 4e - 1 - \int_{0}^{1} e^{x} f'(x) dx - 3 \int_{0}^{1} e^{x} dx$$

$$2 \int_{0}^{1} e^{x} f'(x) = 4e - 1 - 3e^{x} |_{0}^{1}$$

$$\int_{0}^{1} e^{x} f'(x) = \frac{1}{2} ((4e - 1) - (3e - 3)) = \frac{e + 2}{2}$$