Indefinite Integrals; Net Change Theorem

1. Evaluate the indefinite integral $\int (3x-2)(4x+3)dx$

2. If $m'(t)$ is the rate of change of the mass of a radioactive sample in kg per year, what does $\int_0^{1000} m'(t)dt$ represent?

3. A baby is born at 7 pounds and gains weight at a rate of $w'(t)$ pounds per month. What does $7 + \int_0^{12} w'(t)dt$ represent?

4. If $f(t)$ represents the rate at which you make money in dollars per year measured from the year you were born, what does $\int_{20}^{30} f(t)dt$ represent?

5. The velocity of a particle moving in a straight line is given by the function $v(t) = 7 - 4t$. Find the displacement, and the distance traveled from $t = 0$ to $t = 4$.

6. The acceleration of a particle moving along a straight line is given by the function $a(t) = 3 - 2t$, and the initial velocity is $v(0) = -2$. Find the velocity at time t, and the distance traveled from $t = 0$ to $t = 5$.

7. The density of Harry Potter's wand is given by the function $\rho(x) = 7 + 3\sqrt[3]{x}$, measured in g per cm. If Harry Potter's wand is approximately 27 cm, find its mass.