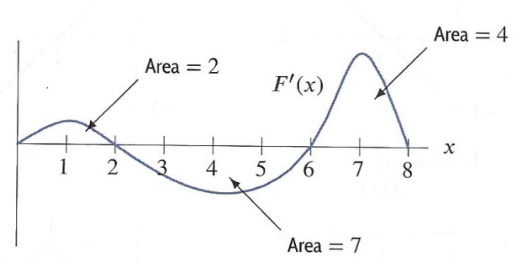
Be able to show your work and solve the following Indefinite integrals.

1. $\int 3\sqrt{x}dx$
2. $\int \frac{3}{x^2}dx$
3. $\int \frac{2x}{1+4x^2}dx$
4. $\int \frac{2x}{(1-x)^{31}}dx$
5. What is the anti-derivative of $f(x) = \frac{1}{x} + 4e^{x^4}x^3$?
6. Suppose that $v(t) = 3x^2 - 2x + 1$ $\frac{\text{mi}}{\text{hr}}$ is the velocity function for a farmer's prop plane. The pilot gets paid \$5.00/mi. of flight. How much will the pilot get paid after 3 hours of flight?
7. A function $F(x)$ has $F(0) = 3$. The derivative function $F'(x)$ is shown here




Use your conceptual knowledge of Calculus to compute the numerical values of: **Hint:**Use the FTC

(a) $F(2) =$
(b) $F(6) =$
(c) $F(8) =$

8. Compute $\int_1^4 \frac{10\sqrt{v}}{(1+v^{3/2})^2}dv$

9. How are Riemann sums related to integrals?

10. Compute the area of the region $R$ bounded by the graphs of $f(x) = -x$ and $g(x) = 2 - x^2$.

11. Compute the area of the region $R$ bounded by the graphs of $f(x) = x^3$ and $g(x) = 2x^2$.

12. Compute the area of the region $R$ bounded by the graphs of $f(x) = x^4 - 2x^2$ and $g(x) = 2x^2$.