

1.  $\int x\sqrt{2x-1} dx$

2.  $\frac{d}{dx} \int_{\tan x}^{2x} t\sqrt{1+t^2} dt$

3. Use the DISK method to find the volume of the solid generated by revolving about the x-axis the region bounded by the curves:

$$y = x^2, \quad y = x^{1/3}.$$

4. Use the SHELL method to find the volume of the solid generated by revolving about the x-axis the region bounded by the curves:

$$y = \sqrt{x}, \quad x = 4, \quad y = 0.$$

5. A chain that weight 15 pounds per foot is hanging from the top of an 80-foot building to the ground. How much work is done in pulling the chain to the top of the building.

6. Find the derivative by logarithmic differentiation:

$$\frac{d}{dx}[(\ln x)^{\ln x}]$$

7. Colbat-60 is used extensively in medical technology. It has a half-life of 5.3 years.

(a) What percentage of a given amount of colbat will remains after 8 years,

(b) If you have 100 grams of cobalt now, how much was there 3 years ago.

8.  $\int_0^{3/2} \frac{1}{9+4x^2} dx$

9.  $\int x \ln(x+1) dx$

10.  $\int \sin^3 x \cos^3 x dx$

11.  $\int \frac{x^2}{(x^2+8)^{3/2}} dx$

12.  $\int \frac{x+1}{x^3+x^2-6x} dx$