





6. For the function  $f(x) = 8 - 3x^2, x \geq 0$

- a. Find  $f^{-1}(x)$
- b. Sketch the graph of  $f(x)$  and  $f^{-1}(x)$
- c. State the domain and range of the function and its inverse.

7. State the **integral definition** of  $y = \ln x$ ; and **show graphically** why it makes sense.

a. State the Fundamental Theorem of Calculus (this shows how to differentiate an integral).

b. Apply the above theorem to differentiate  $y = \ln x$ .

8.

a. Find  $f'(x)$  for  $f(x) = 3^{x^3} + \sqrt{e^{2x}}$

b. Find  $f'(x)$  for  $f(x) = (2x^3 + 3x)^{5x-x^3}$ .

9.

a. Find  $f'(x)$  for  $f(x) = \ln(x^2 + x^3 + 5)$

b. Find  $f'(x)$  for  $y = \frac{(x^3 + x^2 - 5)\sqrt{x-1/x}}{(x^2 + 3)^2 (x+5)^3 (9x-7)^4}$

10. The Thulium isotope  $^{168}\text{Tm}$  has a half-life of approximately 93 days. If a sample weighs 10 milligrams initially, how much remains after  $t$  days? Estimate, but do not calculate, how much will be left after 100 days?