1. $500 is deposited into an account that earns interest at 7.5% compounded continuously. How much will the account be worth in 10 years?

2. How much should be deposited into an account paying 5.2% compounded continuously, in order to have accumulated $10,000 in 15 years?

3. How long will it take for an account compounded continuously at 6% to quadruple?

4. At what interest rate will $8000 grow to $12,000 over 11 years, if the account is compounded continuously?

5. Find $f[g(x)]$ and $g[f(t)]$, given the following:
   
   (a) $f(t) = t^2 + 2t; \quad g(x) = x + 5$
   
   (b) $f(t) = e^t + 7; \quad g(x) = x^2$
6. Find derivatives of the following:

(a) \( f(x) = x^3 - 6x + e^x + e^{2x} \)

(b) \( g(x) = e^{\sqrt{x}+10x^2-6} \)

(c) \( h(x) = e^{\frac{3}{\sqrt{x^3-14x^2}}} \)

(d) \( r(x) = 2e^{\frac{1}{x}-7x^5} \)

(e) \( k(x) = 7xe^{x^8+1} \)

(f) \( y = 3x^2e^{(x^2+3)^4(x+6)^{10}} \)

(g) \( m(x) = \frac{e^x + e^{-x}}{3x^4 + 8} \)
(h) \( g(x) = 2^x + x^2 \)

(i) \( n(x) = 3^{-x+6\sqrt{x}} + e^{2x} + 7 \)

(j) \( y = 4x^6 - 8x^{-2} + \ln x - \ln 3 \)

(k) \( f(x) = \ln (x^2 + 4x^6)^3 \)

(l) \( y = \ln \left( \frac{3x^4 + 9}{\sqrt{x} + 17} \right) \)
(m) \( f(x) = \log_5 (3x^5 - 4x^2 + 3) + \log_6 2 \)

(n) \( g(x) = 4 \log_2 (x^3 + 9x^7) \)

(o) \( h(x) = \left( \log_7 x^2 \right)^3 \)

(p) \( y = \log_3 (\ln (\log_4 x^2)) \)

7. Find the equation of the tangent line to \( y = \ln x + e^x \) at \( x = 1 \).
8. Using calculus, find the pertinent information and graph $y = e^x - e^{-x}$.
9. Using calculus, find the pertinent information and graph \( y = \frac{\ln x}{x} \).
10. Find $\frac{dy}{du}$, $\frac{du}{dx}$, and $\frac{dy}{dx}$, expressing $\frac{dy}{dx}$ in terms of $x$.

(a) $y = u^{10}; \quad u = \sqrt[3]{x} - \frac{1}{x}$

(b) $y = e^u; \quad u = \sqrt{x} + x^7$

(c) $y = \ln u; \quad u = x^2 + 9$
11. Given $f(x) = 25x + e^{-x}$, find
   
   (a) the relative rate of change of $f(x)$.
   (b) the percentage rate of change of $f(x)$.

12. If the price-demand equation for a product is given to be $x = 5(p - 60)^2$, determine whether the demand is elastic, inelastic, or has unit elasticity at the indicated prices:
   
   (a) $p = $10
   (b) $p = $20
   (c) $p = $25
13. Given demand for a product is $x = (225 - 5p)^{1/2}$,

(a) Classify the type of elasticity at the current price of $10$.

(b) If the price changes by 10%, what is the approximate change in demand?

(c) Should the price be raised or lowered from the current price in order to increase revenue?

(d) What price maximizes revenue?