1. Solve the following equations for $x$.
   (a) $e^{4x} \cdot e^{\ln(7)} = 3$
   (b) $5 \cdot \ln(x) = 6$
   (c) $360e^{-0.5x} = 180$

2. Use properties of exponents to write the following expressions in the form $3^{kx}$ for a suitable constant $k$.
   (a) $(3^{7x} \cdot 3^{-x})^{1/5}$
   (b) $(9^{1/2} \cdot 9^{-1/4})^{7x}$

3. Use the product rule to find the first derivative of $f(x) = x^7(x^2 - 1)^4$. Factor your answer fully.

4. Use the quotient rule to find the first derivative of $f(x) = \frac{3x}{6-5x}$. Simplify your answer fully.

5. Sixty dollars is deposited into a savings account at 5.2% interest compounded continuously.
   (a) What differential equation is satisfied by $A(t)$, the balance after $t$ years?
   (b) What is the formula for $A(t)$, the balance after $t$ years?

6. The size of the honeybee population in North Raleigh is given by $P(t) = 300e^{0.02t}$ where $t$ is measured in days.
   (a) How many honeybees were present initially?
   (b) What is the growth constant?
   (c) At what time will the population equal 1500?
   (d) How large will the population be when it is growing at a rate of 8 honeybees per day?
7. Differentiate each of the following:

(a) \( y = e^{5x} \)

(b) \( y = 7xe^x \)

(c) \( y = \ln(x^4) \)

(d) \( y = \ln((5x - 2)(8 - x)(2x + 3)) \)