Take this quiz as you would take a quiz in class. When you are done, check your work against the answers given in the back of the book.

In Exercises 1–8, use properties of exponents to simplify the expression.

1. $4^3(4^x)$  
2. $\left(\frac{1}{6}\right)^{-3}$
3. $\frac{3^x}{3^3}$  
4. $(5^{1/2})(3^{1/2})$
5. $(e^3)(e^4)$  
6. $(e^{2/3})(e^2)$
7. $\frac{e^2}{e^{-4}}$  
8. $(e^{-1})^{-3}$

In Exercises 9–14, sketch the graph of the function.

9. $f(x) = 3^x - 2$
10. $f(x) = 5^{-x} + 2$
11. $f(x) = 6^x - 3$
12. $f(x) = e^{x+2}$
13. $f(x) = e^x + 3$
14. $f(x) = e^{-2x} + 1$
15. After $t$ years, the remaining mass $y$ (in grams) of an initial mass of 35 grams of a radioactive element whose half-life is 80 years is given by

$$y = 35 \left(\frac{1}{2}\right)^{t/80}, \quad t \geq 0.$$  
How much of the initial mass remains after 50 years?

16. With an annual rate of inflation of 4.5% over the next 10 years, the approximate cost $C$ of goods or services during any year in the decade is given by

$$C(t) = P(1.045)^t, \quad 0 \leq t \leq 10$$

where $t$ is the time (in years) and $P$ is the present cost. The price of a baseball game ticket is presently $20. Estimate the price 10 years from now.

17. Find the balance in an account when interest is compounded (a) quarterly, (b) monthly, and (c) continuously.

18. How much should be deposited in an account paying 6% interest compounded monthly in order to have a balance of $14,000 after 5 years?

In Exercises 19–22, find the derivative of the function.

19. $y = e^{5x}$  
20. $y = e^{x^2}$
21. $y = 5e^{x^2}$  
22. $y = 3e^x - xe^x$

23. Determine an equation of the tangent line to

$$y = e^{-2x}$$

at the point $(0, 1)$.

24. Analyze and sketch the graph of

$$f(x) = 0.5xe^{-0.5x}.$$  
Label any relative extrema, points of inflection, and asymptotes.