Practice the following problems using rules of derivative (primarily the chain rule in addition to the power, multiplicative, quotient rules)

6. $y = \sqrt{4x^2 + 1}$

6. $\dfrac{4x}{\sqrt{4x^2 + 1}}$

14. $y = \dfrac{1}{(3x + 8)^2}$

14. $-\dfrac{6}{(3x + 8)^3}$

22. $f(x) = x^3\sqrt{5x + 2}$

22. $\dfrac{x^2(35x + 12)}{2\sqrt{5x + 2}}$

26. $f(x) = \left(\dfrac{2x}{x^2 + 1}\right)^3$

26. $-\dfrac{24x^2(x^2 - 1)}{(x^2 + 1)^4}$

40. Find $\dfrac{dy}{dt}$ if $y = \dfrac{1}{3u^5 - 7}$ and $u = 7t^2 + 1$.

40. $-\dfrac{210t(7t^2 + 1)^4}{(3(7t^2 + 1)^5 - 7)^2}$

52. Let $h(x) = \sqrt{1 + 5x^2}$.

a) Find functions f and g such that $h(x) = (f \circ g)(x)$.
b) Find $(f \circ g)'(4)$.

52. (a) $f(x) = \sqrt{x}$, $g(x) = 1 + 5x^2$; **(b)** $\frac{20}{9}$

60. Total cost. A total-cost function is given by

$$C(x) = 2000(x^2 + 2)^{1/3} + 700,$$

where $C(x)$ is the total cost, in thousands of dollars, of producing x airplanes. Find the rate at which total cost is changing when 20 airplanes have been produced.

60. \$489,574/airplane

64. Compound interest. If \$1000 is invested at interest rate r, compounded monthly, in 3 yr it will grow to an amount A given by (see Section R.1)

$$A = \$1000\left(1 + \frac{r}{12}\right)^{36}.$$

a) Find the rate of change, dA/dr, and give its units.
b) Explain what dA/dr represents.

64. (a) $\frac{dA}{dr} = 3000\left(1 + \frac{r}{12}\right)^{35}$; units are dollars per interest rate.
(b) It is the rate of change in the amount as the interest rate r changes.