

CALCULUS
The quotient rule
NEW

NEW 0350-1. Differentiate $f(x) = (x^5 + 7x + \sqrt{2})e^x$.

NEW 0350-2. Differentiate $u = \frac{x^5 + 7x + \sqrt{2}}{e^x}$.

NEW 0350-3. Differentiate $F(r) = \left(\frac{6e^r + 7}{r^3 - 4r^5} \right) \left(\frac{2r - 5}{r^2 + e^r} \right)$.

NEW 0350-4. Differentiate $G(w) = e^{3-w}$.
Hint: $e^{3-w} = e^3/e^w$.

NEW 0350-5. Differentiate $H(z) = e^{5+3z}$.
Hint: $e^{5+3z} = e^5(e^z)(e^z)(e^z)$.

NEW 0350-6. Differentiate $y = (e^3 + 1)(x^2 + 2)e^{-3x}$.

0350-7. Find an equation of the tangent line
to $y = \frac{2x - 5}{x + 2}$ at $(7, 1)$.

0350-8. Find an equation of the tangent line
to $y = (x^2 - 3x - 2)e^x$ at $(0, -2)$.

0350-9. Find an equation of the tangent line
to $y = (x^2 - 3x - 2)e^{-x}$ at $(0, -2)$.

0350-10. NEW Say $p(8) = 3$ and $p'(8) = 6$.
Say $q(8) = 9$ and $q'(8) = 5$.

a. Let $g(x) = \frac{p(x)}{q(x)}$. Compute $g(8)$ and $g'(8)$.

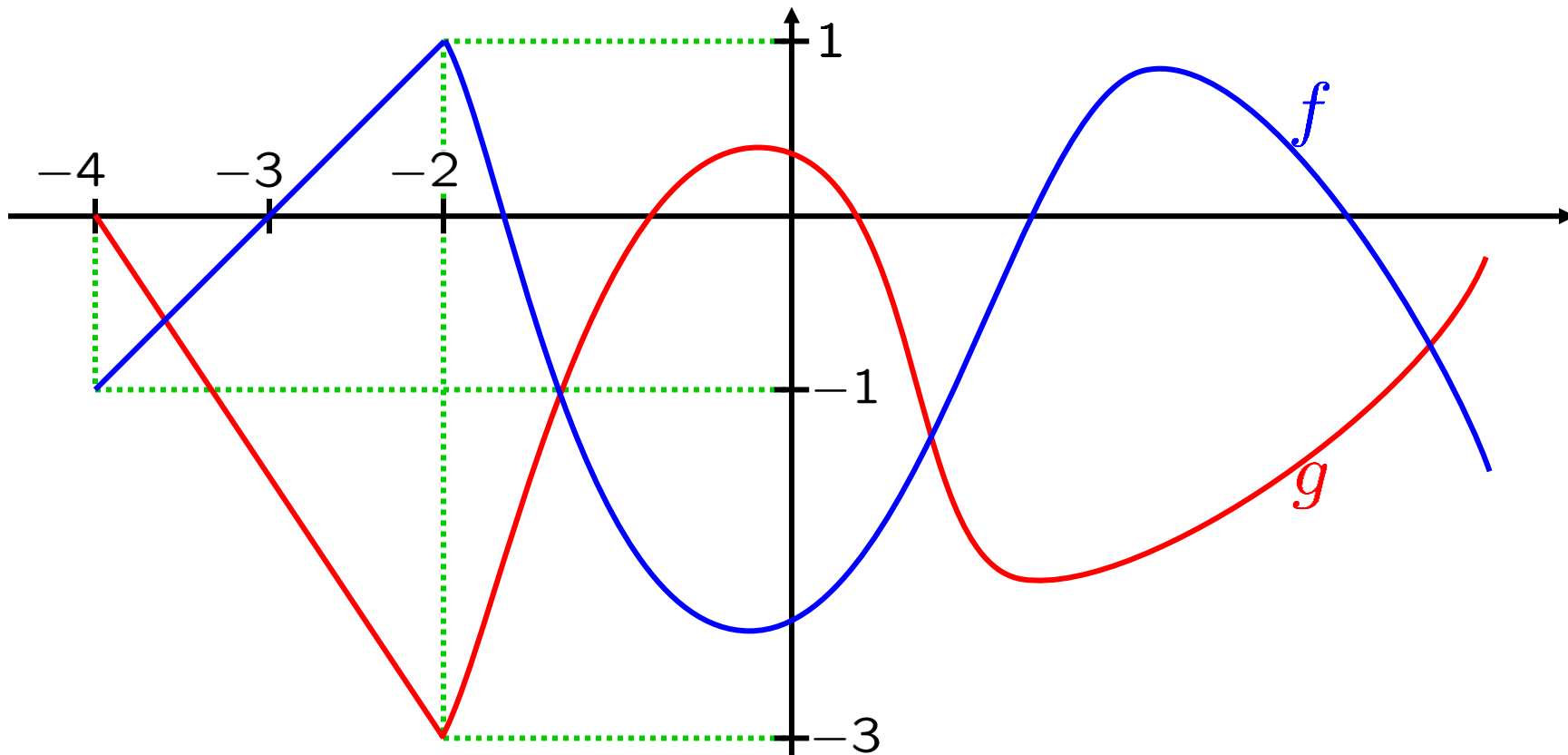
b. Let $h(x) = [p(x)] [q(x)]$.
Compute $h(8)$ and $h'(8)$.

0350-11. NEW Say $w(4) = -1$ and $w'(4) = -2$.

a. Compute $\left[\frac{d}{dt} \left(e^{-3t} (w(t)) \right) \right]_{t \rightarrow 4}$.

b. Compute $\frac{d}{dt} \left(\left[e^{-3t} (w(t)) \right]_{t \rightarrow 4} \right)$.

0350-12. The graphs of f and g are shown below.



a. Find $\left[\frac{d}{dq} ([f(q)][g(q)]) \right]_{q: \rightarrow -3}$. c. Find $\frac{d}{dq} ([f(q)][g(q)])_{q: \rightarrow -3}$.

b. Find $\left[\frac{d}{dq} \left(\frac{f(q)}{g(q)} \right) \right]_{q: \rightarrow -3}$. d. Find $\frac{d}{dq} \left(\left[\frac{f(q)}{g(q)} \right]_{q: \rightarrow -3} \right)$. 5