MA 181 Using the Product and Quotient Rules
Section 3.2

1. Use the product rule to find each derivative and simplify your results.

(a) $y = e^x(x^2 - 8)$	(b) $f(x) = (3x-1)(x^2+5x+2)$

2. Differentiate each quotient and simplify your results. Only use the quotient rule when necessary.

(a) $f(x) = \dfrac{3x+1}{3x-1}$	(b) $f(x) = \dfrac{2x^2+3}{x^3-x+4}$
(c) $f(x) = \dfrac{x}{x^2+1}$	(d) $f(x) = \dfrac{x^2+1}{x}$

OVER →

(e) $f(x)=\dfrac{e^x}{x^4}$	(f) $f(x)=\dfrac{x^4+3x^2-5x+1}{\sqrt{x}}$

3. Assume that f(x) and g(x) are differentiable functions of x.

x	f(x)	$f'(x)$	g(x)	$g'(x)$
0	5	9	9	-3
1	3	-3	2	6

Use the given table and the rules of differentiation to find the following.

(a) Let $p(x)=-4f(x)g(x)$. Find $p'(1)$.	(b) Let $h(x)=\dfrac{e^x}{f(x)}$. Find $h'(0)$.

Answers

1 (a) $y'=e^x(x+4)(x-2)$	1 (b) $f'(x)=9x^2+28x+1$
2 (a) $f'(x)=\dfrac{-6}{(3x-1)^2}$	2 (b) $f'(x)=\dfrac{-2x^4-11x^2+16x+3}{(x^3-x+4)^2}$
2 (c) $f'(x)=\dfrac{1-x^2}{(x^2+1)^2}$	2 (d) $f'(x)=1-\dfrac{1}{x^2}$ *or* $\dfrac{x^2-1}{x^2}$
2 (e) $f'(x)=\dfrac{e^x(x-4)}{x^5}$	2 (f) $f'(x)=\dfrac{7}{2}x^{5/2}+\dfrac{9}{2}x^{1/2}-\dfrac{5}{2x^{1/2}}-\dfrac{1}{2x^{3/2}}$ *or* $\dfrac{7x^4+9x^2-5x-1}{2x^{3/2}}$
3 (a) $p'(1)=-48$	3 (b) $h'(0)=-\dfrac{4}{25}$