Keeper 4.2 Virtual Problems – Product and Quotient Rules

Differentiate:

1. $f(x) = (x^2 + 2x)e^x$

2. $g(x) = \sqrt{x}e^x$

3. $g(x) = \dfrac{1+2x}{3-4x}$

4. $g(x) = \dfrac{x^2-2}{2x+1}$

5. $H(u) = (u - \sqrt{u})(u + \sqrt{u})$

6. $f(y) = \left(\dfrac{1}{y^2} - \dfrac{3}{y^4}\right)(y + 5y^3)$

7. $y = \dfrac{t^2+2}{t^4-3t^2+1}$

8. $y = e^p(p + p\sqrt{p})$

9. $g(t) = \dfrac{t=\sqrt{t}}{t^{\frac{1}{3}}}$

10. $y = \dfrac{e^x}{1-e^x}$

Find $f'(x)$ and $f''(x)$

11. $f(x) = x^{\frac{5}{2}}e^x$

12. $f(x) = \dfrac{2}{x-3}$

13 $f(x) = \dfrac{x^2}{1+x}$

Suppose that $f(2) = -3, g(2) = 4, f'(2) = -2$, and $g'(2) = 7$. Find $h'(2)$ for each.

14. $h(x) = f(x)g(x)$

15. $h(x) = \frac{f(x)}{g(x)}$
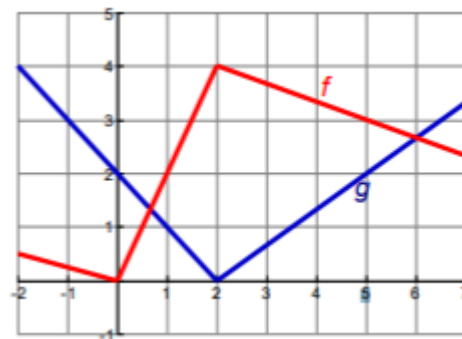
16. $h(x) = \frac{x^2}{f(x)}$

17. $h(x) = \frac{2+g(x)}{1+f(x)}$

18. If $g(x) = x \cdot f(x)$, where $f(3) = 4$ and $f'(3) = -2$, find an equation of the tangent line to the graph at g at the point where $x = 3$.

19. If f and g are the functions whose graphs are shown, let $u(x) = f(x)g(x)$ and $w(x) = \frac{f(x)}{g(x)}$.

a. Find $u'(1)$

b. Find $w'(5)$

20. Let $P(x) = F(x)G(x)$ and $Q(x) = \frac{F(x)}{G(x)}$, where F and G are the functions whose graphs are shown.

a. Find $P'(2)$

b. Find $Q'(7)$