

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

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

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

4.  $G(x) = \frac{x^2-2}{2x+1}$

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

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

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

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

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

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

11-12: Find  $f'(x)$  and  $f''(x)$ .

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

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

13. If  $f(x) = \frac{x^2}{1+x}$ , find  $f''(1)$

14-17: 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.  $h(x) = \frac{f(x)}{g(x)}$

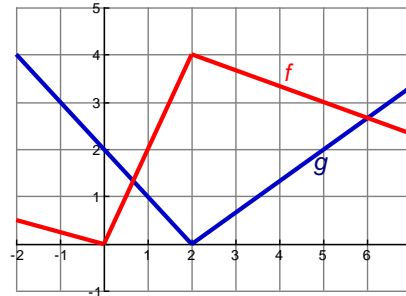
16.  $h(x) = \frac{g(x)}{f(x)}$

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

18. If  $g(x) = xf(x)$ , where  $f(3) = 4$  and  $f'(3) = -2$ , find an equation of the tangent line to the graph of  $g$  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  $w(x) = \frac{f(x)}{g(x)}$ .

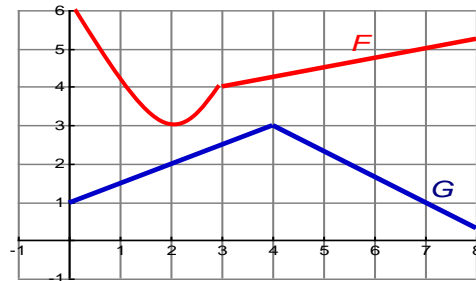
A.) Find  $u'(1)$ .



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  $Q'(7)$ .

Answers:

1.)  $f'(x) = e^x(x^2 + 4x + 2)$

2.)  $g'(x) = e^x \left( \frac{2x+1}{2x^{\frac{1}{2}}} \right)$

3.)  $g'(x) = \frac{10}{(3-4x)^2}$

4.)  $G'(x) = \frac{2x^2 + 2x + 4}{(2x+1)^2}$

5.)  $H'(u) = 2u - 1$

6.)  $F'(y) = 9y^{-4} + 14y^{-2} + 5$

7.)  $y' = \frac{-2t^5 - 8t^3 + 14t}{(t^4 - 3t^2 + 1)^2}$

8.)  $y' = e^p \left( p^{\frac{3}{2}} + p + \frac{3}{2}p^{\frac{1}{2}} + 1 \right)$

9.)  $g'(t) = \frac{2}{3}t^{-\frac{1}{3}} - \frac{1}{6}t^{-\frac{5}{6}}$

10.)  $y' = \frac{e^x}{(1-e^x)^2}$

11.)  $f'(x) = e^x \left( x^{\frac{5}{2}} + \frac{5}{2}x^{\frac{3}{2}} \right)$   
 $f''(x) = e^x \left( x^{\frac{5}{2}} + \frac{10}{2}x^{\frac{3}{2}} + \frac{15}{4}x^{\frac{1}{2}} \right)$

12.)  $f'(x) = \frac{-2}{(x-3)^2}$   
 $f''(x) = \frac{4}{(x-3)^3}$

13.)  $f''(1) = \frac{1}{4}$

14.)  $h'(2) = -29$

15.)  $h'(2) = \frac{13}{16}$

16.)  $h'(2) = -\frac{13}{9}$

17.)  $h'(2) = -\frac{3}{2}$

18.)  $y - 12 = -2(x - 3)$

19.) a.)  $u'(1) = 0$

b.)  $w'(5) = -\frac{2}{3}$

20.) a.)  $P'(2) = \frac{3}{2}$

b.)  $Q'(7) = \frac{43}{12}$