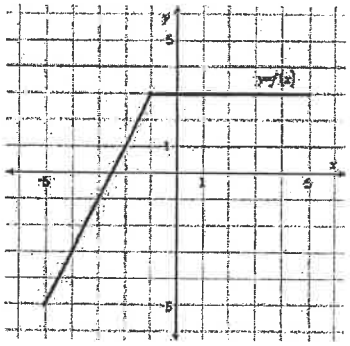
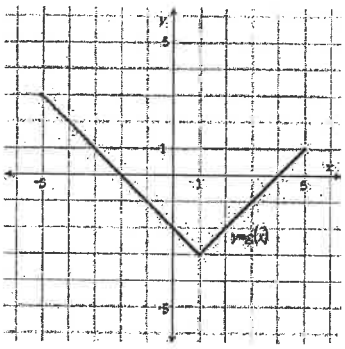
Exercises 1-10: Below are given values for functions *f*, *g* and *h* and their first derivatives at selected values. For each exercise, find the specified derivative using this information.

$f(1)=4$	$f'(1)=-5.7$	$g(1)=3$	$g'(1)=-0.6$	$h(1)=1$	$h'(1)=5$
$f(2)=3$	$f'(2)=0.7$	$g(2)=2$	$g'(2)=-0.2$	$h(2)=4$	$h'(2)=6$
$f(3)=2$	$f'(3)=-0.1$	$g(3)=2.6$	$g'(3)=-0.63$	$h(3)=7$	$h'(3)=7$
$f(4)=5$	$f'(4)=-7$	$g(4)=0.9$	$g'(4)=-0.2$	$h(4)=12$	$h'(4)=8$
$f(5)=1$	$f'(5)=1$	$g(5)=1$	$g'(5)=-0.81$	$h(5)=18$	$h'(5)=9$

1. $K'(2);K(x)=13.2\cdot g(x)$
2. $K'(4);K(x)=6.8+f(x)$
3. $K'(2);K(x)=h(x)/3$
4. $K'(2);K(x)=h(x^2)$
5. $K'(9);K(x)=g(2x-15)$
6. $K'(3);K(x)=f(x)g(x)$
7. $K'(4);K(x)=h(x)/f(x)$
8. $K'(2);K(x)=h\left((g(x))^2\right)$
9. $K'(5);K(x)=h(x)f(x)g(x)$
10. $K'(2);K(x)=g(f(h(x)))$

Exercises 11-16: Below are the graphs of function f and g. For each exercise, find the specified derivative using the information in the graphs.





11. $K'(4);K(x)=f(x)+g(x)$
12. $K'(2);K(x)=4f(x)-5g(x)$
13. $K'(2);K(x)=f(x)/g(x)$
14. $K'(-2);K(x)=g(x^2)$
15. $K'(-4);K(x)=f(g(x))$
16. $K'(3);K(x)=g(f(x))$

(Ostebee, Zorn, Calculus, p. 231)

17. Let $h(x)=f(g(x))$ and $j(x)=f(x)\cdot g(x)$. Fill in the missing entries in the table.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$	$h(x)$	$h'(x)$	$j(x)$	$j'(x)$
-1	3	2	1	1/10	0	-1/2	3	23/10
0	0	1/2	-1	1	3	2	0	-1/2
1	0	-5	0	4	0	2	0	0

1) $k'(2) = 13.2g'(2)$

$= 13.2(-0.2)$

$\boxed{= -2.64}$

2) $k'(4) = 6.8 + f'(4)$

$= 6.8 - 7$

$\boxed{= -0.2}$

3) $k'(2) = \frac{1}{3}h'(2)$

$= \frac{1}{3}(6)$

$\boxed{= 2}$

4) $k'(2) = 4h'(2^2)$

$= 4h'(4)$

$= 4(8)$

$\boxed{= 32}$

5) $k'(9) = 2g'(2(9) - 15)$

$= 2g'(3)$

$= 2(-0.63)$

$\boxed{= -1.26}$

6) $k'(3) = f'(3)g(3) + g'(3)f(3)$

$= -0.1(2.6) + (-0.63)(2)$

$= -0.26 - 1.26$

$\boxed{= -1.52}$

7) $k'(4) = \frac{f(4)h'(4) - h(4)f'(4)}{f^2(4)}$

$= \frac{5(8) - 12(-7)}{25}$

$= \frac{40 + 84}{25}$

$= \frac{124}{25}$

$\boxed{= 4.96}$

8) $k'(2) = h'\left[(g(2))^2\right](2g(2))(g'(2))$

$= h'(2^2)\,2(2)(-0.2)$

$= 8(4)(-0.2)$

$\boxed{= -6.4}$

9) $k'(5) = h'(5)f(5)g(5) + h(5)f'(5)g(5) + h(5)f(5)g'(5)$

$= 9(1)(1) + 18(1)(1) + (18)(1)(-0.81)$

$= 9 + 18 - 14.58$

$\boxed{= 12.42}$

10) $k'(2) = g'(f(h(2)))\, f'(h(2))\, h'(2)$

$= g'(f(4))\, f'(4)(6)$

$= g'(5)(-7)(6)$

$= -0.81(-42)$

$\boxed{= 34.02}$

11) $k'(4) = f'(4) + g'(4)$

$= 0 + 1$

$\boxed{= 1}$

12) $k'(2) = 4f'(2) - 5g'(2)$

$= 4(0) - 5(1)$

$= \boxed{-5}$

13) $k'(2) = \dfrac{g(2)f'(2) - f(2)g'(2)}{[g(2)]^2}$

$= \dfrac{(-2)(0) - 3(1)}{(-2)^2}$

$= \boxed{-3/4}$

14) $k'(-2) = g'((-2)^2)\, 2(-2)$

$= g'(4)(-4)$

$= (1)(-4)$

$\boxed{= -4}$

15) $k'(-4) = f'(g(-4))\, g'(-4)$

$= f'(2)(-1)$

$= 0(-1)$

$\boxed{= 0}$

16) $k'(3) = g'(f(3))\, f'(3)$

$= g'(3)(0)$

$\boxed{= 0}$

17 on paper

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

$h'(x) = f'(g(x))\, g'(x)$

$h'(-1) = f'(g(-1))\, g'(-1)$

$-1/2 = f'(1)\, g'(-1)$ $\quad -1/2 = f'(1)(1)$

$-5 = f'(1)$

$h'(0) = f'(g(0))\, g'(0)$

$h'(0) = f'(-1)(1)$

$h'(0) = 2(1)$

$h'(0) = 2$

$h'(1) = f'(g(1))\, g'(1)$

$2 = f'(0)\, g'(1)$

$2 = 1/2\, g'(1)$ $\quad 4 = g'(1)$

$j'(-1) = f'(-1)g(-1) + g'(-1)f(-1)$

$j'(-1) = (2)(1) + g'(-1)\,3$

$j'(-1) = 2 + 3g'(-1)$

$\frac{23}{10} = 2 + 3g'(-1)$

$\frac{1}{10} = g'(-1)$

$j'(0) = f'(0)g(0) + g'(0)f(0)$

$j'(0) = \frac{1}{2}(-1) + 1(0)$

$j'(0) = -\frac{1}{2}$

$h(0) = f(g(0))$

$h(0) = f(-1)$

$h(0) = 3$

$j'(1) = f'(1)g(1) + g'(1)f(1)$

$j'(1) = (-5)(0) + 4f(1)$

$j'(1) = 4f(1)$

$j'(1) = 4(0)$

$= 0$

$h(1) = f(g(1))$

$h(1) = f(0)$

$h(1) = 0$

$h(x) = f\left(j(x)/f(x)\right)$

$h'(x) = f'\left(j(x)/f(x)\right)\left(\frac{f(x)j'(x) - j(x)f'(x)}{f^2(x)}\right)$

$h'(-1) = f'\left(j(-1)/f(-1)\right)\left(\frac{f(-1)j'(-1) - j(-1)f'(-1)}{f^2(-1)}\right)$

$-\frac{1}{2} = f'\left(3/3\right)\left(\frac{3j'(-1) - (3)(2)}{3^2}\right)$

$-\frac{1}{2} = f'(1)\left(\frac{3j'(-1) - 6}{9}\right)$

$-\frac{1}{2} = -5\left(\frac{3j'(-1) - 6}{9}\right)$

$\frac{9}{10} = 3j'(-1) - 6$

$\frac{69}{10} = 3j'(-1)$

$\frac{23}{10} = j'(-1)$

$h(0) = f\left(j(0)/f(0)\right)$

$h(0) = f(0/0)$

$h(1) = f\left(j(1)/f(1)\right)$

$h(1) = f\left(0/f(1)\right)$?

$h(1) = f(0)$

$h(1) = 0$

$h(-1) = f\left(j(-1)/f(-1)\right)$

$0 = f\left(3/3\right)$

$0 = f(1)$