25/23

More on rules of derivatives
By: Designing team

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1. If $f(5)=1$, $f'(5)=6$, $g(5)=-3$, $g'(5)=2$. Find the values of

a) $(f\cdot g)'(5)$ = $(1)(2)+(-3)(6)$ = $2-18$ = $(f\cdot g)'(5)$ = $\boxed{-16}$

b) $(f/g)'(5)$ = $\frac{(-3)(6)-(1)(2)}{(-3)^2}$ = $\frac{-18-2}{9}$ = $\boxed{\frac{-20}{9}}$

c) $(g/f)'(5)$ = $\frac{(1)(2)-(6)(-3)}{(1)^2}$ = $\frac{2+18}{1}$ = $\boxed{20}$

2. If $f(3)=4$, $g(3)=2$, $f'(3)=-6$ and $g'(3)=5$, find the following values

$f(3)=4$
$f'(3)=-6$
$g(3)=2$
$g'(3)=5$

a) $(f+g)'(3)$ = $-6+5$ = $\boxed{-1}$

b) $(f\cdot g)'(3)$ = $(4)(5)+(-6)(2)$ = $20-12$ = $\boxed{8}$

c) $(f/g)'(3)$ = $\frac{(2)(-6)-(4)(5)}{(2)^2}$ = $\frac{-12-20}{4}$ = $\frac{-32}{4}$ = $\boxed{-8}$

3. If $h(x)=f(x)g(x)$, use the table to find $h'(-1)$, $h'(0)$ and $h'(1)$

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

$h'(-1)$ = $(1)(2)+(2)(1)$ = $\boxed{4}$

$h'(0)$ = $(-1)(3)+(0)(-1)$ = $\boxed{-3}$

$h'(1)$ = $(-1)(5)+(0)(2)$ = $\boxed{10}$

4. If $h(x)=f(x)/g(x)$, use the table to find $h'(-1)$, $h'(0)$ and $h'(1)$

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

$h'(-1)$ = $\frac{(1)(1)-(2)(2)}{(1)^2}$ = $\frac{1-4}{1}$ = $\boxed{-3}$

$h'(0)$ = $\frac{(-1)(0)-(-1)(3)}{(-1)^2}$ = $\frac{3}{1}$ = $\boxed{3}$

$h'(1)$ = $\frac{(2)(-1)-(2)(5)}{(2)^2}$ = $\frac{-2-10}{4}$ = $\boxed{-3}$

5. Considering that $P(x)=F(x)G(x)$ y $Q(x)=F(x)/G(x)$, where F and G are functions whose graphs are shown below.

a) Find $P'(2)$

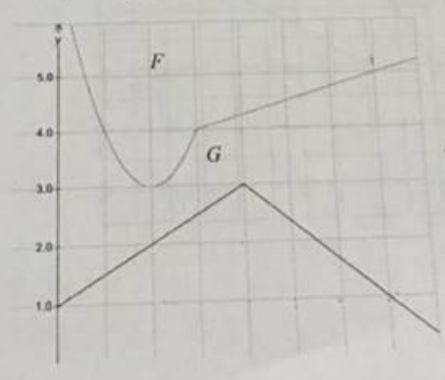
b) Find $Q'(7)$

$F(2)=3$ $G(2)=2$

$F'(2)=0$ $G'(2)=\frac{1}{2}$

$P'(2)=(3)(\frac{1}{2})+(2)(0)$

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



$F(7)=5$ $G(7)=1$

$F'(7)=\frac{1}{4}$ $G'(7)=-\frac{2}{3}$

$Q'(7)=\frac{(1)(\frac{1}{4})-(5)(-\frac{2}{3})}{(1)^2}$

$Q'(7)=\frac{\frac{1}{4}+\frac{10}{3}}{1}=\frac{43}{12}$