Calculus 1
Section 3.5 – Derivatives Numerical Table

Differentiable functions *f* and *g* have the values shown in the table.

x	f	f'	g	g'
0	2	1	5	−4
1	3	2	3	−3
2	5	3	1	−2
3	10	4	0	−1

1. If $h(x)=f(x)+2g(x)$, find $h'(3)$.

   A) -2 B) 2 C) 7 D) 8 D) 10

2. If $h(x)=f(x)g(x)$, find $h'(2)$.

   A) -20 B) -7 C) -6 D) -1 E) 13

3. If $h(x)=\dfrac{1}{g(x)}$, find $h'(1)$.

   A) $-\dfrac{1}{2}$ B) $-\dfrac{1}{3}$ C) $-\dfrac{1}{9}$ D) $\dfrac{1}{9}$ E) $\dfrac{1}{3}$

4. If $h(x)=\sqrt{f(x)}$, find $h'(3)$.

   A) $\dfrac{1}{4}$ B) $\dfrac{1}{2\sqrt{10}}$ C) 2 D) $\dfrac{2}{\sqrt{10}}$ E) $4\sqrt{10}$

5. If $h(x)=\dfrac{f(x)}{g(x)}$, find $h'(0)$.

   A) $-\dfrac{13}{25}$ B) $-\dfrac{1}{4}$ C) $\dfrac{13}{25}$ D) $\dfrac{13}{16}$ E) $\dfrac{22}{25}$

6. If $h(x)=f\left(g(x)\right)$, find $h'(1)$.

   A) -12 B) -6 C) 4 D) 6 E) 12

7. If $h(x)=f\left(x^2\right)$, find $h'(1)$.

   A) 2 B) 6 C) 8 D) 12 E) 54

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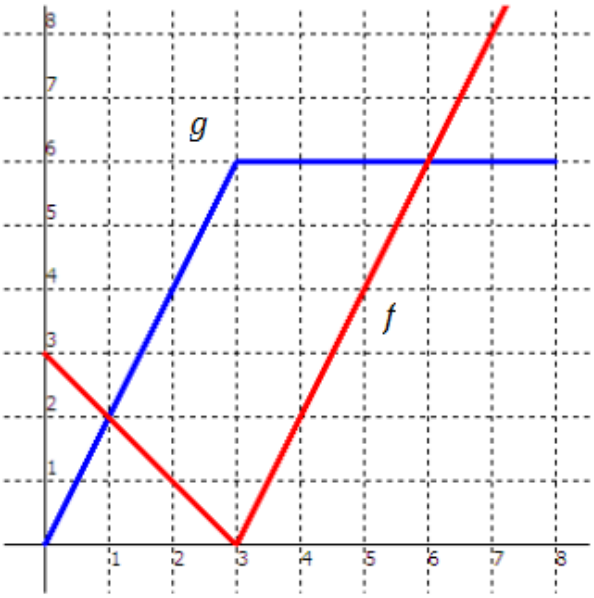
If *f* and *g* are the functions whose graphs are shown, find the following.



8. If $h(x)=f(x)g(x)$ find $h'(2)$.

9. If $h(x)=\dfrac{f(x)}{g(x)}$ find $h'(2)$.

10. If $h(x)=f\left(g\left(x\right)\right)$ find $h'(2)$.

11. If $h(x)=x^2g(x)$ find $h'(2)$.

12. If $h(x)=\left[g(x)\right]^2$ find $h'(2)$.

13. If $h(x)=\dfrac{x}{f(x)}$ find $h'(4)$.

14. If $h(x)=\sqrt{f\left(x\right)}$ find $h'(4)$.

15. If $h(x)=\sqrt{x}f\left(x\right)$ find $h'(4)$.

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① $h'=f'+2g'$
$h'(3)=f'(3)+2g'(3)$
$=4+2(-1)$
$=2$

② $h'=fg'+gf'$
$h'(2)=f(2)g'(2)+g(2)f'(2)$
$=5(-2)+1(3)$
$=-7$

③ $h(x)=[g(x)]^{-1}$
$h'=-1(g(x))^{-2}\cdot g'(x)=\dfrac{-g'}{g^2}$
$h'(1)=\dfrac{-g'(1)}{[g(1)]^2}=\dfrac{-(-3)}{3^2}=\dfrac{3}{9}=1/3$

④ $h(x)=(f)^{1/2}$
$h'=\frac{1}{2}f^{-1/2}\cdot f'=\dfrac{f'}{2\sqrt{f}}$
$h'(3)=\dfrac{f'(3)}{2\sqrt{f(3)}}=\dfrac{4}{2\sqrt{10}}=\dfrac{2}{\sqrt{10}}$

⑤ $h'=\left.\dfrac{g\cdot f'-fg'}{g^2}\right|_{x=0}$
$=\dfrac{5(1)-2(-4)}{5^2}=\dfrac{13}{25}$

⑥ $h'=f'(g(x))\cdot g'(x)\big|_{x=1}$
$=f'(g(1))\cdot g'(1)$
$=f'(3)\cdot(-3)$
$=4\cdot-3=-12$

⑦ $h'=f'(x^2)\cdot 2x$
$h'(1)=f'(1)\cdot 2$
$=2\cdot 2$
$=4$

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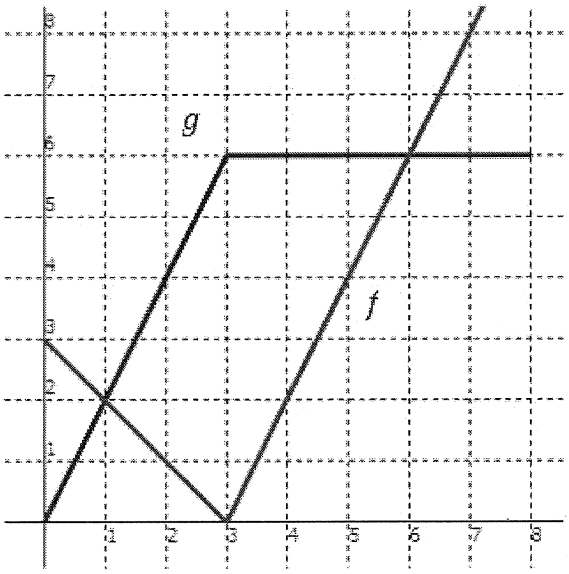

8. If $h(x)=f(x)g(x)$ find $h'(2)$. $h' = fg' + gf' = 1(2) + 4(-1) = -2$

9. If $h(x)=\dfrac{f(x)}{g(x)}$ find $h'(2)$. $h' = \dfrac{gf' - fg'}{g^2} = \dfrac{4(-1) - 1(2)}{4^2} = \dfrac{-6}{16} = \dfrac{-3}{8}$

10. If $h(x)=f\big(g(x)\big)$ find $h'(2)$. $h' = f'(g)\cdot g' = f'(4)\cdot g'(2) = 2\cdot 2 = 4$

11. If $h(x)=x^2g(x)$ find $h'(2)$. $h' = x^2g' + g\cdot 2x = 2^2\cdot 2 + 4\cdot 2\cdot 2 = 8 + 16 = 24$

12. If $h(x)=\big[g(x)\big]^2$ find $h'(2)$. $h' = 2g\cdot g' = 2(4)(2) = 16$

13. If $h(x)=\dfrac{x}{f(x)}$ find $h'(4)$. $h' = \dfrac{f\cdot(1) - xf'}{f^2} = \dfrac{2(1) - 4(2)}{2^2} = \dfrac{-6}{4} = \dfrac{-3}{2}$

14. If $h(x)=\sqrt{f(x)}$ find $h'(4)$. $h' = \frac{1}{2}(f)^{-1/2}\cdot f' = \frac{1}{2}\cdot(2)^{-1/2}\cdot 2 = \dfrac{1}{\sqrt{2}}$

15. If $h(x)=\sqrt{x}f(x)$ find $h'(4)$. $h' = \sqrt{x}\cdot f' + f\cdot\frac{1}{2}x^{-1/2} = \sqrt{4}\cdot 2 + 2\cdot\frac{1}{2}\cdot\frac{1}{\sqrt{4}}$

$= 4 + 1/2$

$= 9/2$