6 - PRODUCT & QUOTIENT RULE 2

Find the derivative.

1. $f(x)=-x^2\sin x$
2. $f(x)=\dfrac{2x-1}{4x-3}$
3. $g(x)=\dfrac{3x-1}{\sqrt{x}}$
4. $g(x)=x\cos x$
5. $g(x)=\cot x$
6. $f(x)=\dfrac{2x^2-3}{2x-1}$
7. $f(x)=\dfrac{3x^2-2}{\sqrt[3]{x}}$
8. $g(x)=\sec x$
9. $f(x)=x\tan x$
10. $f(x)=x^2(x-2)$

11. Use the quotient rule develop the formula for $f(x)=\cot x$.

Find the derivative for the given value of x.

12. $f(x)=\dfrac{\sin x}{x}$; $x=\dfrac{\pi}{2}$
13. $f(x)=\dfrac{3x^2-1}{2x-5}$; $x=-2$
14. $f(x)=-\csc x$; $x=\dfrac{\pi}{4}$

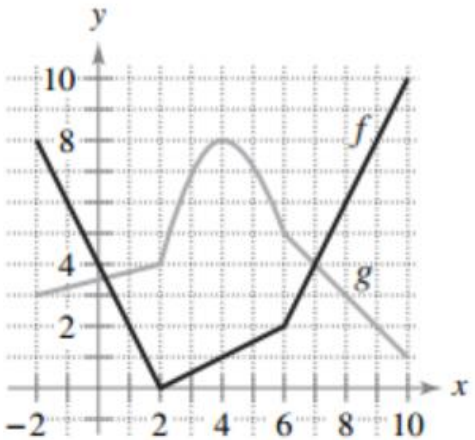
Find the equation of the tangent line at the given value of x.

15. $f(x)=\dfrac{4x-1}{5x-5}$; $x=-1$
16. $f(x)=-\csc x$; $x=\dfrac{\pi}{4}$

17. Use the graph of f and g if $p(x)=f(x)g(x)$ and $q(x)=\dfrac{f(x)}{g(x)}$ to find each.

a. $p'(4)$

b. $q'(7)$



Answers

1. $-2x\sin x - x^2\cos x$
2. $\dfrac{-2}{(4x-3)^2}$
3. $\dfrac{3}{2x^{\frac{1}{2}}} + \dfrac{1}{2x^{\frac{3}{2}}}$
4. $\cos x - x\sin x$
5. $-\csc^2 x$
6. $\dfrac{4x^2-4x+6}{(2x-1)^2}$
7. $5x^{2/3} + \dfrac{2}{3x^{4/3}}$
8. $\sec x \tan x$
9. $\tan x + x\sec^2 x$
10. $3x^2 - 4x$
11. $-\csc^2 x$
12. $\dfrac{-4}{\pi^2}$
13. $\dfrac{86}{81}$
14. $\sqrt{2}$
15. $y - \dfrac{1}{2} = \dfrac{-3}{20}(x+1)$
16. $y + \sqrt{2} = \sqrt{2}\left(x + \dfrac{\pi}{4}\right)$
17. A. 4 B. $\dfrac{3}{4}$