2.1 Product and Quotient Rules: Quiz C

Name: _____ Time: 25 minutes No calculator 40 points

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Answer exactly the question asked. Show work on every question. Angles are in radians.
If a derivative does not exist, write DNE. If a function value does not exist, write *undefined*.

1. Find $f'(x)$ for each function. **(2 each, 10 pts)**
   You need not list x-values where $f'(x)$ does not exist.

   (a) $f(x) = x^2 \tan x$

   (b) $f(x) = \dfrac{x-5}{2x+3}$

   (c) $f(x) = \dfrac{x^3+2x}{4x^3+8x}$

   (d) $f(x) = 2\cot x + \cos x \sec x$

   (e) $f(x) = \dfrac{\pi^2}{\tan\left(\frac{\pi}{4}\right)}$

2. Let $f(x) = (x+1)\cos x$. Find an equation of the tangent line to the graph of f at $x = \pi$. **(5 pts)**

3. Let $f(x) = 2x - \tan x$. **(5 pts)**
   Find every x in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ at which the graph of f has a horizontal tangent line.

4. Figure C4 shows the graphs of f (solid) and g (dashed). **(4 each, 8 pts)**
Each graph is made of straight line segments that meet at grid points. Let $p(x) = f(x)\,g(x)$ and $q(x) = \dfrac{g(x)}{f(x)}$.

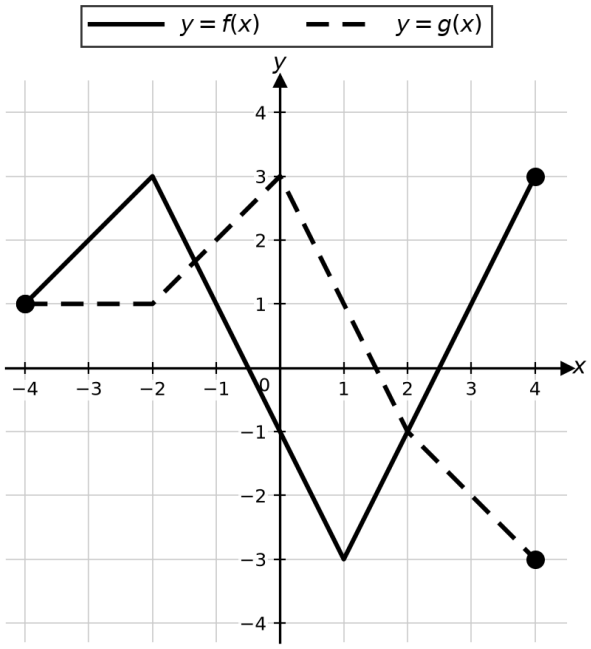


Figure C4

(a) Find $p'(3)$.

(b) Find $q'(-1)$.

5. Each part describes a different function. **(4 each, 8 pts)**

(a) Let $q(x) = \dfrac{f(x)}{g(x)}$. It is known that $f(1) = 4$, $f'(1) = 2$, $g(1) = 2$, and $q'(1) = -2$. Find $g'(1)$.

(b) Let $h(x) = (x+1)\,f(x)$. It is known that $f'(2) = -1$ and $h'(2) = 5$. Find $f(2)$.

6. The table gives selected values of f, g, and their derivatives. **(3 + 1, 4 pts)**
Let $h(x) = f(x)\,g(x)$ and $k(x) = f'(1)\,g'(3)$ for every x.

x	$g'(x)$	$f'(x)$	$f(x)$	$g(x)$
1	1	−3	2	4
2	−2	4	−1	3
3	3	0	5	−2

(a) Find $h'(2)$.

(b) Find $k'(3)$.