2.3-2.5 Derivative Rules: Quiz A

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. Answers need not be simplified.

1. Find each derivative or derivative value. **(16 pts)**

   (a) $y = x^2 \cos(2x)$. Find y'' when $x = \pi$.

   (b) $f(x) = (1 - 2x)^3$. Find $f^{(4)}(x)$.

   (c) $y = \dfrac{3}{(5 - 2x)^4}$. Find $\dfrac{dy}{dx}$ when $x = 3$.

   (d) $y = \sin^2(4x) + \sin(4x^2)$. Find y'.

   (e) $w(t) = \sqrt{(t + 2)^2 - (t - 2)^2 - 8t + 9}$. Find $\dfrac{dw}{dt}$.

2. Let $h(x) = f(x)\, g(x)$. The table gives values of f, g and their derivatives. **(5 pts)**

x	$f''(x)$	$g(x)$	$f'(x)$	$g''(x)$	$f(x)$	$g'(x)$
0	-3	1	2	-2	5	6
2	4	-2	-1	1	3	5

   Find $h''(2)$.

3. Figure A3 shows f (solid) and g (dashed), made of segments joined at grid points. **(4 pts)**

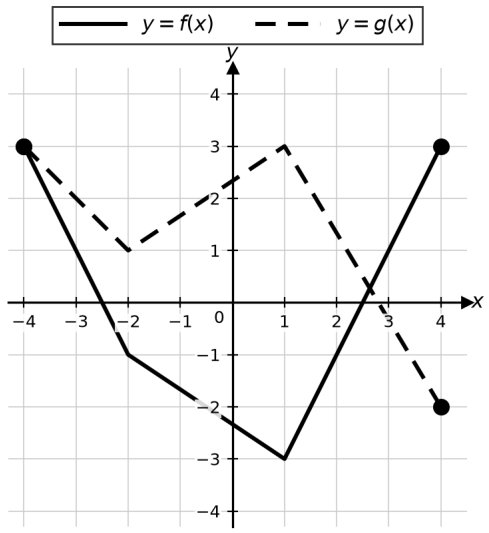


Figure A3

Let $k(x) = f(g(x))$. Find $k'(-3)$.

4. In (a) and (c), each equation defines y implicitly as a function of x. **(10 pts)**

(a) The curve $3x^2 - 2xy + 3y^2 = 11$ passes through $(1, 2)$. Find $\dfrac{dy}{dx}$ at $(1, 2)$.

(b) In this part only, y is the independent variable and x is a function of y. For $\cos(x) = y^3$, find $\dfrac{dx}{dy}$.

(c) The curve $x^3 + y^2 = 9$ passes through $(2, 1)$. Find $\dfrac{d^2y}{dx^2}$ at $(2, 1)$.

5. The curve $x\,g(y) = 12$ passes through $(3, 2)$. The table gives values of g and g'. **(5 pts)**

x	$g'(x)$	$g(x)$
2	-2	4
3	4	-1

Find $\dfrac{dy}{dx}$ at $(3, 2)$.