

Math 131 - Quiz 6

October 1, 2025

Name key

Score _____

Show all work to receive credit. Supply explanations where necessary.

1. (2 points) Let
- $h(x) = 2g(x)f(x)$
- . Given the following information, compute
- $h'(2)$
- .

$$f'(0) = 7, \quad f(2) = -4, \quad f'(2) = 8, \quad g(0) = 0, \quad g(2) = -5, \quad g'(2) = 9$$

$$h'(x) = 2g'(x)f(x) + 2g(x)f'(x)$$

$$h'(2) = 2g'(2)f(2) + 2g(2)f'(2) = 2(9)(-4) + 2(-5)(8) = \boxed{-152}$$

2. (3 points) Which one of these is an equation for the line tangent to the graph of
- $y = 4\sqrt{x} + \frac{32}{x}$
- at the point where
- $x = 4$
- ? Show work to receive credit.

(a) $y + 1 = 16(x - 4)$

(b) $y - 1 = 16(x - 4)$

☒ (c) $y = -x + 20$

(d) $y = -x + 16$

$$\frac{dy}{dx} = 2x^{-1/2} - 32x^{-2}$$

$$\text{Slope: } \left. \frac{dy}{dx} \right|_{x=4} = 1 - 2 = -1$$

$$\text{Point: } x = 4, y = 8 + 8 = 16$$

$$y - 16 = -1(x - 4)$$

or

$$\boxed{y = -x + 20}$$

3. (2 points) Let
- $h(x) = \frac{f(x)}{x}$
- . Given the following information, compute
- $h'(2)$
- .

$$f'(0) = 7, \quad f(2) = -4, \quad f'(2) = 8, \quad g(0) = 0, \quad g(2) = -5, \quad g'(2) = 9$$

$$h'(x) = \frac{f'(x) \cdot x - f(x) \cdot 1}{x^2} = \frac{x f'(x) - f(x)}{x^2}$$

$$h'(2) = \frac{2 \cdot f'(2) - f(2)}{(2)^2} = \frac{2(8) - (-4)}{4} = \frac{20}{4} = \boxed{5}$$

4. (3 points) Find
- $\frac{d^2y}{dx^2}$
- when
- $y = 6x^3 - 4x^2 + \cos x$
- .

$$\frac{dy}{dx} = 18x^2 - 8x - \sin x$$

$$\boxed{\frac{d^2y}{dx^2} = 36x - 8 - \cos x}$$