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QUIZ 6

MATH 200, SECTION 1

March 5, 2021

Directions: Closed book, closed notes, no calculators.

By submitting this quiz you affirm that you agree with this statement: *On my honor, I have neither given nor received unauthorized aid on this assignment, and I pledge that I am in compliance with the VCU Honor System.*

1. $\frac{d}{dx}\left[\frac{2x^5+e^x}{1-x}\right] = \frac{(10x^4+e^x)(1-x)-(2x^5+e^x)(-1)}{(1-x)^2}$

$= \frac{10x^4+e^x-10x^5-xe^x+2x^5+e^x}{(1-x)^2} = \boxed{\frac{10x^4+2e^x-8x^5-xe^x}{(1-x)^2}}$

2. Find all x for which the tangent line to $y = f(x) = \sqrt{x} - 2x$ at $(x, f(x))$ is horizontal.

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

Solve $f'(x) = 0$

$\frac{1}{2}x^{-\frac{1}{2}} - 2 = 0$

$\frac{1}{2\sqrt{x}} - 2 = 0$

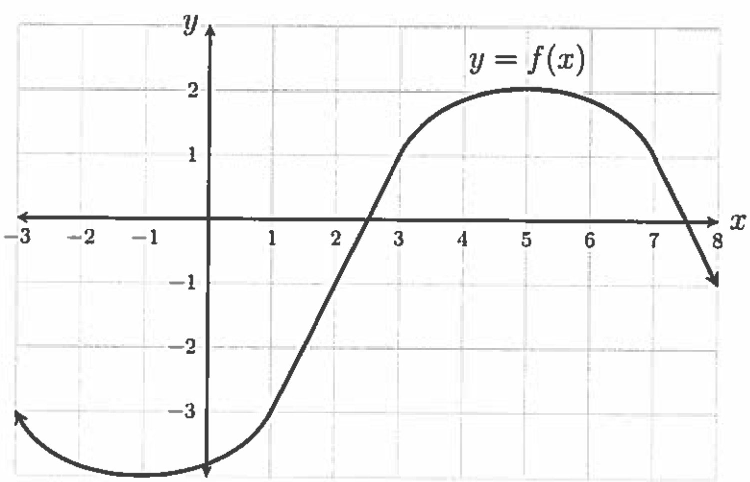
$\frac{1}{2\sqrt{x}} = 2$

$\frac{1}{4} = \sqrt{x}$

$\frac{1}{16} = x$

Answer: Tangent horizontal at $x = \frac{1}{16}$

3. Answer the question involving the function $f(x)$ whose graph is sketched below.



(a) State all x for which $f'(x) = 0$.

$\boxed{x = -1 \text{ and } x = 5}$

(b) Let $g(x) = f(x) \cdot f(x)$. Find $g'(2)$.

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

$= 2f(x)f'(x)$

$g'(2) = 2 \cdot f(2)f'(2)$

$= 2 \cdot (-1)2 = \boxed{-4}$

(c) Let $h(x) = \frac{x}{f(x)}$. Find $h'(5)$.

$h'(x) = \frac{1 \cdot f(x) - x f'(x)}{(f(x))^2}$ so $h'(5) = \frac{1 \cdot f(5) - 5 \cdot f'(5)}{(f(5))^2}$

$= \frac{1 \cdot 2 - 5 \cdot 0}{2^2} = \boxed{\frac{1}{2}}$