Math 108
Spring 2024
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Quiz Three
Show all your work

Problem 1: Shown is the graph of $y = f(x)$. Answer the following questions.
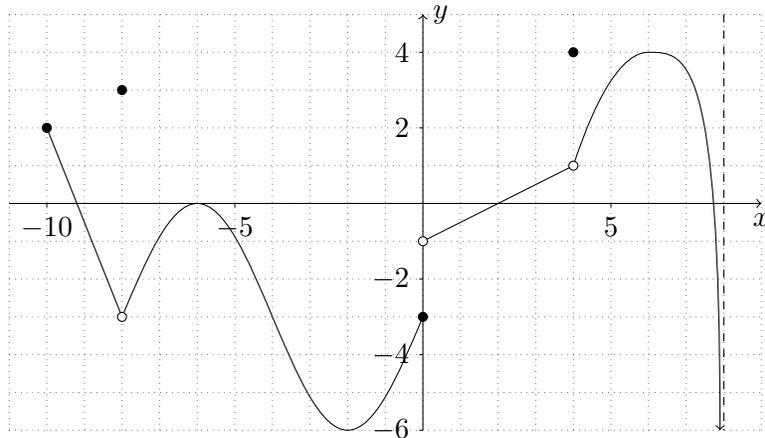
a. State all value(s) of x in the domain where f is discontinuous.

$$\boxed{-8,\ 0,\ 4}$$

b. $f'(-9) =$ $\boxed{-5/2}$

c. $\displaystyle\lim_{x\to-2} \frac{f(x) - f(-2)}{x+2} =$ $\boxed{0}$

d. $\displaystyle\lim_{x\to3.1415} \frac{f(x) - f(3.1415)}{x - 3.1415} =$ $\boxed{1/2}$

e. $\displaystyle\lim_{h\to0^+} \frac{f(-8+h) - f(-8)}{h} =$ $\boxed{-\infty}$

f. $\displaystyle\lim_{x\to4} \frac{f(x) - f(4)}{x - 4} =$ $\boxed{DNE}$

Score: ___/6

Problem 2: Find the derivatives of the following functions.

a. $f(x) = (x^3 + 3)(5 - x^4)$

$$f'(x) = 3x^2(5 - x^4) + (x^3 + 3)(-4x^3) = -7x^6 - 12x^3 + 15x^2$$

b. $g(x) = \dfrac{\pi x^5 - 4}{6x + 1}$

$$g'(x) = \frac{5\pi x^4(6x+1) - (\pi x^5 - 4)6}{(6x+1)^2} = \frac{24\pi x^5 + 5\pi x^4 + 24}{(6x+1)^2}$$

Score: ___/4