

Directions: show all work and simplify answers

1. Solve the limit that represents the derivative of some function f at some number a and also solve for $f(a)$.

a)

$$\lim_{h \rightarrow 0} \frac{2^{3+h} - 10}{h}$$

b)

$$\lim_{h \rightarrow 0} \frac{\cos(\pi + h) + 1}{h}$$

2. The quantity (in kilogram) of strawberry that is sold by the farmer's market at a price of Z dollars per kilogram is $P = f(Z)$.

- a) What would the derivative, $f'(9)$ represent? What would the unit be for $f'(9)$?
b) Is $f'(9)$ positive or negative? Explain your reasoning's.

3. Using the definition of a derivative (not the short cut method), find the derivative of the following functions:

Definition of Derivatives

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

a) $f(x) = x^3$ at $x=3$

b) $f(x) = \frac{1}{4x+2}$

c) $f(x) = x^2 - 5x$

d) $f(x) = \sqrt{3-6x}$ and find the domain(s) for $f(x)$