

Math 234 Practice Problems for Exam 1

- Let $f(x) = \frac{x-1}{\sqrt{3x-2}}$ and $g(x) = (x+1)^2 - 4$.
 - Find the values of $f(5)$ and $g(2)$.
 - Find the domain of f and the range of g .
 - Compute the composite function $f(g(x))$.
 - Find the x and y intercepts of g .
 - Draw the graph of g .
- Find the equations of lines with the given properties.
 - passes through $(2,0)$ and $(5,3)$.
 - passes through $(1,2)$ and has the slope 3.
 - passes through $(2,3)$ and parallel to the line $x + y = 5$.
 - passes through $(0,1)$ and perpendicular to the line $x - y = 1$.
- Find the limit if it exists or say that it does not exist.
 - $\lim_{x \rightarrow 1} \frac{x+2}{x+1}$
 - $\lim_{x \rightarrow 2} \frac{x^2-4}{x-2}$
 - $\lim_{x \rightarrow \infty} \frac{100-3x^3}{2x^3-6x+2}$
 - $\lim_{x \rightarrow -\infty} \frac{1+2x^2}{x-1}$
- Let $f(x) = \frac{x^2-4}{x+2}$.
 - Find $\lim_{x \rightarrow -2^-} f(x)$ and $\lim_{x \rightarrow -2^+} f(x)$.
 - Is $f(x)$ defined at $x = -2$?
 - Is $f(x)$ continuous at -2 ?
- Let $f(x) = \frac{1}{x+1}$.

(a) Compute the derivative of f at 2 using the difference quotient definition.

(b) Find the tangent line of f at 2.

6. Find the derivatives of the following functions.

(a) $f(x) = x^2 + \sqrt{x}$ at $x = 4$.

(b) $f(t) = 2\sqrt[3]{t} + \frac{1}{\sqrt[3]{t}}$ at $t = 1$.

(c) $y = (x - 8)(1 - 2x^3)$ at $x = -1$.

(d) $g(u) = \frac{2u + 1}{u^2 - 1}$ at $u = 0$.

7. Suppose that when the price of a certain commodity is p dollars per unit, then x thousand units will be purchased by consumers where $p = -\frac{1}{2}x + 200$. The cost of producing x thousand units is $C(x) = \frac{1}{2}x^2 + 100x + 100$.

(a) Find the profit function $P(x)$.

(b) Find the rate of change of $P(x)$ when $x = 30$.

(c) Find the percentage rate of change of $P(x)$ when $x = 30$.