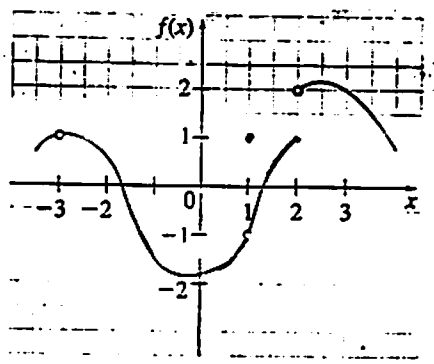
M 250
P. STALEY

Practice Exam #1 name _____

1. For the curve $y = \sqrt{x} + x$, find the slope M_{PQ} of the secant line through the points
$P = (1, f(1))$
and $Q = (4, f(4))$.

2. If a ball is thrown into the air with a velocity of 80 ft/s, its height after t seconds is given by $y = 80t - 16t^2$. Find the average velocity in ft/s for the time period beginning when $t = 1$ and lasting 2 seconds.

3. State the value of the limit, if it exists, from the given graph.
(a) $\lim_{x \to 3} f(x)$ (b) $\lim_{x \to 1} f(x)$ (c) $\lim_{x \to -3} f(x)$
(d) $\lim_{x \to 2^-} f(x)$ (e) $\lim_{x \to 2^+} f(x)$ (f) $\lim_{x \to 2} f(x)$



4 Find the value of the limit $\lim_{x \to 3^-} \frac{|x-3|}{x-3}$.

5 Find the value of the limit $\lim_{h \to 0} \frac{(h-2)^2 - 4}{h}$.

6 Find the value of the limit $\lim_{x \to 4} \frac{x-4}{\sqrt{x}-2}$.

7 How close to 7 do we have to take x so that $3x+4$ is within a distance of 0.2 from 25?

8 In using the ϵ, δ notation to prove that $\lim_{x \to 2} (2x-1) = 3$, when ϵ is 1/2, what is the largest value

that δ can have?

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9a At what value of x does the function $(x+1)^2/(x^2-1)$ have a removable discontinuity?

9b At what value of x does the function $|x-2|/(x-2)$ have a jump discontinuity?

10 At what value or values of x is the function

$$f(x) = \begin{cases} |x+1|-1 & \text{if } x < 0 \\ x^2+x & \text{if } 0 \le x < 1 \\ 3-x & \text{if } 1 \le x \end{cases}$$

discontinuous?

11 If a ball is thrown into the air with a velocity of 80 ft/s, its height in feet after t seconds is given by $y = 80t - 16t^2$. It will be at maximum height when its instantaneous velocity is zero. Find its average velocity from the time it is thrown ($t = 0$) to the time it reaches its maximum height.

12 Find an equation of the line tangent to the curve $y = x + (1/x)$ at the point $(5, 26/5)$.