Find the following limits.

Each answer should be a number, ∞ , $-\infty$, or DNE (only if the other answers do not apply).

SCORE: _____/7 PTS

-0 INDETERMINATE

[a] $\lim_{x \to 1^{+}} \frac{4 - x^{2}}{1 - x^{4}} = -\infty$

3 - 3 ENO POINTS

ONLY ANSWER

[b] $\lim_{x \to -\infty} \frac{\sqrt{7x^6 - 5}}{13x^3 + 11x^2}$

(m)

 $\frac{\sqrt{7}\times^{6}-5}{13\times^{3}+11\times^{2}}$

X3 (5)

 $[c] \qquad \lim_{x \to \infty} (e^{-x} - 6 \tan^{-1} x)$

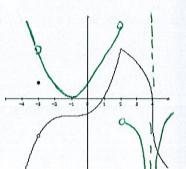
= -17-0

The graph of f(x) is shown on the right.

the right.

[a] Find all x-coordinates where f(x) is not differentiable, and explain <u>very briefly</u> why.

[b] Sketch a graph of f'(x) on the same axes.



SCORE:

GRADED BY ME

Determine if the function below is continuous at x = -1. SCORE: ______/4 PTS State your conclusion clearly, and show whether each condition in the definition of "continuous (at a point)" is true or false.

<u>In addition</u>, if it is not continuous, determine the type of discontinuity, and state the conditions in the definition of that type of discontinuity that are true.

$$f(x) = \begin{cases} x^3 - x^4 - x^6, & \text{if } x < -1 \\ -3, & \text{if } x = -1 \\ x^7 + x^5 - x, & \text{if } x > -1 \end{cases}$$

$$f \text{ HAS A JUMP}$$

$$5 \text{ INCE } \begin{cases} x = -1 \\ x = -1 \end{cases}$$

F HAS A JUMP DISCONTINUITY OF X=-1

SINCE I'M F(X) AND I'M F(X) BOTH EXIST

BUT ARE NOT EQUAL

$$f(-1) = -3$$
 EXISTS,
 $\lim_{x \to -1^+} f(x) = \lim_{x \to -1^+} (x^7 + x^5 - x) = -1 - 1 + | = -1$
 $\lim_{x \to -1^+} f(x) = \lim_{x \to -1^+} (x^3 - x^4 - x^6) = -1 - 1 - 1 = -3$
 $\lim_{x \to -1^-} f(x) = \lim_{x \to -1^-} (x^3 - x^4 - x^6) = -1 - 1 - 1 = -3$

AT X = -1

Let
$$f(x) = \frac{x}{8-x}$$
.

[a] Find
$$f'(x)$$
.

[c]

$$\begin{array}{c|c}
\hline
 & \times + h - x \\
 & 8 - (x + h) - 8 - x \\
 & h - 0 - h - (8 - x - h) - x - (8 - x - h) \\
 & h - 0 - h - (8 - x - h) - (8 - x)
\end{array}$$

$$\frac{1}{5} | \frac{8}{h \to 0} | \frac{8}{(8-x)^2} | \frac{8}$$

[b] Find the slope-point form of the equation of the tangent line to the curve of
$$f(x)$$
 at the point where $x = 6$.

SLOPE =
$$f'(6) = \frac{8}{2^2} = 2.0$$

POINT = $(6, f(6)) = (6, \frac{6}{2}) = (6, 3)$

The position of an object moving along a line is $s(t) = \frac{t}{8-t}$ inches, where t is the time in seconds.

Find the instantaneous velocity of the object at time t=2 seconds. Give the correct units for your answer.

Find the instantaneous velocity of the object at time
$$t = 2$$
 seconds. Given $S'(2) = \frac{8}{6^2} = \frac{2}{9}$ IN CHES/SECOND $\frac{1}{2}$

Your score on a test depends on how much time you spent studying for it the day before the test. SCORE: /2 PTS Suppose P = f(s), where P is your score on the test, in points, and s is the number of hours you studied for it the day before. What does f'(3) = 5 mean? Your answer must use all the numbers from that equation, and the correct units for those numbers. NOTE: Your answer must NOT use "slope", "change" nor "derivative". IF YOU STUDIED 3 HOURS THE DAY BEFORE THE TEST, YOU WOULD SCORE 5 MORE POINTS FOR EACH ADDITIONAL HOUR GRADEN BY ME YOU HAD STUDIED

write the formal definitions of the following terms as shown in lecture.		SCORE:/3P1
[a]	derivative (function)	
	THE DERIVATIVE OF f is f'(x) = lim f(x+h)-f(x)	GRADER
[b]	continuous (at a point)	DY ME
	f ISCONTINUOUS AT A IE FLA) EXISTS Im FLX) E	SXISTS

AND
$$\lim_{x \to a} f(x) = f(a)$$