

SCORE: ___ / 20 POINTS

What month is your birthday? _____

What are the first 2 digits of your address? _____

What are the last 2 digits of your zip code? _____

What are the last 2 digits of your social security number? _____

[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER,
USE YOUR STUDENT ID NUMBER]**NO CALCULATORS ALLOWED**

State the Intermediate Value Theorem.

SCORE: ___ / 2 POINTS

IF f IS CONTINUOUS ON $[a, b]$
 AND d IS BETWEEN $f(a)$ AND $f(b)$
 THEN THERE IS A VALUE c IN (a, b)
 SUCH THAT $f(c) = d$

 $\frac{1}{2}$ POINT EACHEvaluate the following limits. Give your answers as ∞ , $-\infty$, a number or DNE.

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The answer should be DNE only if the other answers do not apply.Show supporting work and/or give a brief explanation. You may use the shorthand notation shown in lecture.

[a] $\lim_{x \rightarrow 2} \frac{x-3}{(x-2)^3}$ DNE

[b] $\lim_{x \rightarrow 3^+} \frac{1-x}{\sqrt{x^2-9}}$ $-\infty$

$\lim_{x \rightarrow 2^+} \frac{x-3}{(x-2)^3} = -\infty$

$\frac{-1}{0^+}$

$\lim_{x \rightarrow 2^-} \frac{x-3}{(x-2)^3} = +\infty$

$\frac{-1}{0^-}$

[c] $\lim_{x \rightarrow 2} \frac{x^2+5}{(x+2)^2} = \frac{9}{16}$

2

[d] $\lim_{x \rightarrow -\infty} (x^4 - 5x^5 - 2x^6) = -\infty$

DEGREE EVEN

LEADING COEFFICIENT NEGATIVE

Find all horizontal asymptotes of $f(x) = \frac{1+3x^2}{(x-1)^2}$.

SCORE: ___ / 4 POINTS

Show supporting work as demonstrated in lecture. DO NOT USE PRECALCULUS SHORTCUTS.

$\lim_{x \rightarrow \pm\infty} \frac{1+3x^2}{(x-1)^2}$

$= \lim_{x \rightarrow \pm\infty} \frac{1+3x^2}{x^2-2x+1} \cdot \frac{\frac{1}{x^2}}{\frac{1}{x^2}}$

$= \lim_{x \rightarrow \pm\infty} \frac{\frac{1}{x^2}+3}{1-\frac{2}{x}+\frac{1}{x^2}} = \frac{0+3}{1-0+0} = 3$

1 POINT EACH

H.A. $y=3$ [MULTIPLE CHOICE] Find $\lim_{x \rightarrow \frac{\pi}{2}^+} e^{-\tan x}$.

$\lim_{x \rightarrow \frac{\pi}{2}^+} e^{-\tan x} = \infty$

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[a] ∞ [b] $-\infty$

[c] 0

[d] 1

LETTER OF CORRECT ANSWER: []

$\lim_{x \rightarrow \frac{\pi}{2}^-} e^{-\tan x} = 0$