EXAM 3 REVIEW

MA 16100 · FALL 2022

DR. HOOD

WARM UP

Which problem from Exam 3 – Fall 2018 do you most want to review? (*questions from Final Exam Fall 2018)

1) L'Hopital's Rule
2) L'Hopital's Rule
3) skip
4) Linear Approximation
5) Optimization
6) Maxima & Minima
7) Concavity
8) Inflection Point
9) Optimization
10) Mean Value Theorem
11) skip
12) Graphing Functions
13) *Final - #20 (Antiderivatives)
14) *Final - #21 (Riemann sums)

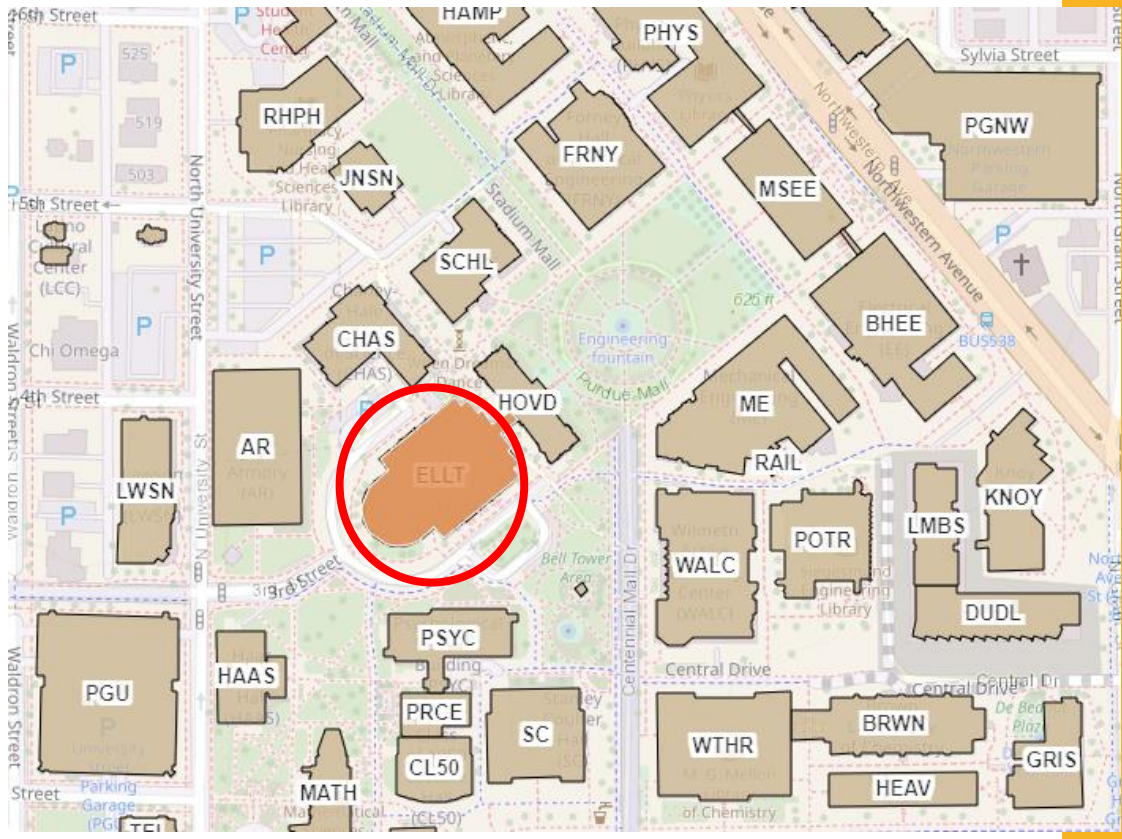
ANNOUNCEMENTS

- Office Hours today at 3:30-4:30pm
  - in person (MATH 844)

- Math Resource Room
  - Open Mon-Thur 9:30am-8:30pm
  - Open Fri 9:30am-3:30pm
  - You can drop in at any time to ask questions

1. WHEN/WHERE IS EXAM 3?

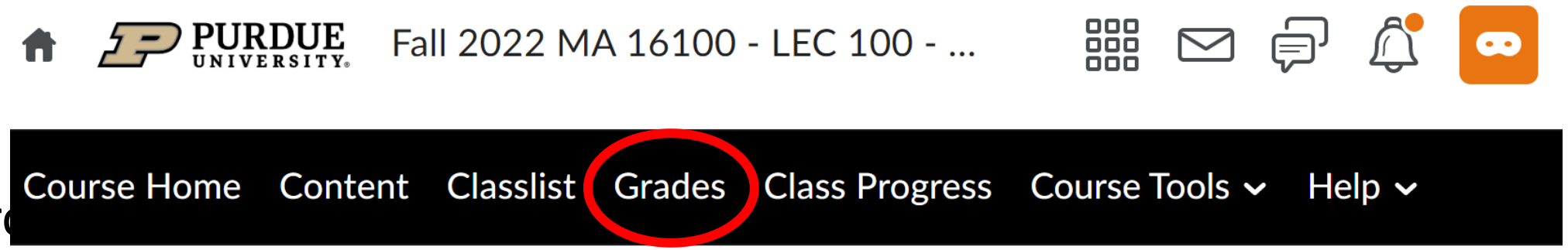
- Tuesday Nov 15
- 6:30-7:30pm in ELLT
- Pick up a lap board at the entrance
  - **Please do not slam lapboard when leaving**



2. ASSIGNED SEATS

Students are assigned seats. To find your assigned seat:

Scr

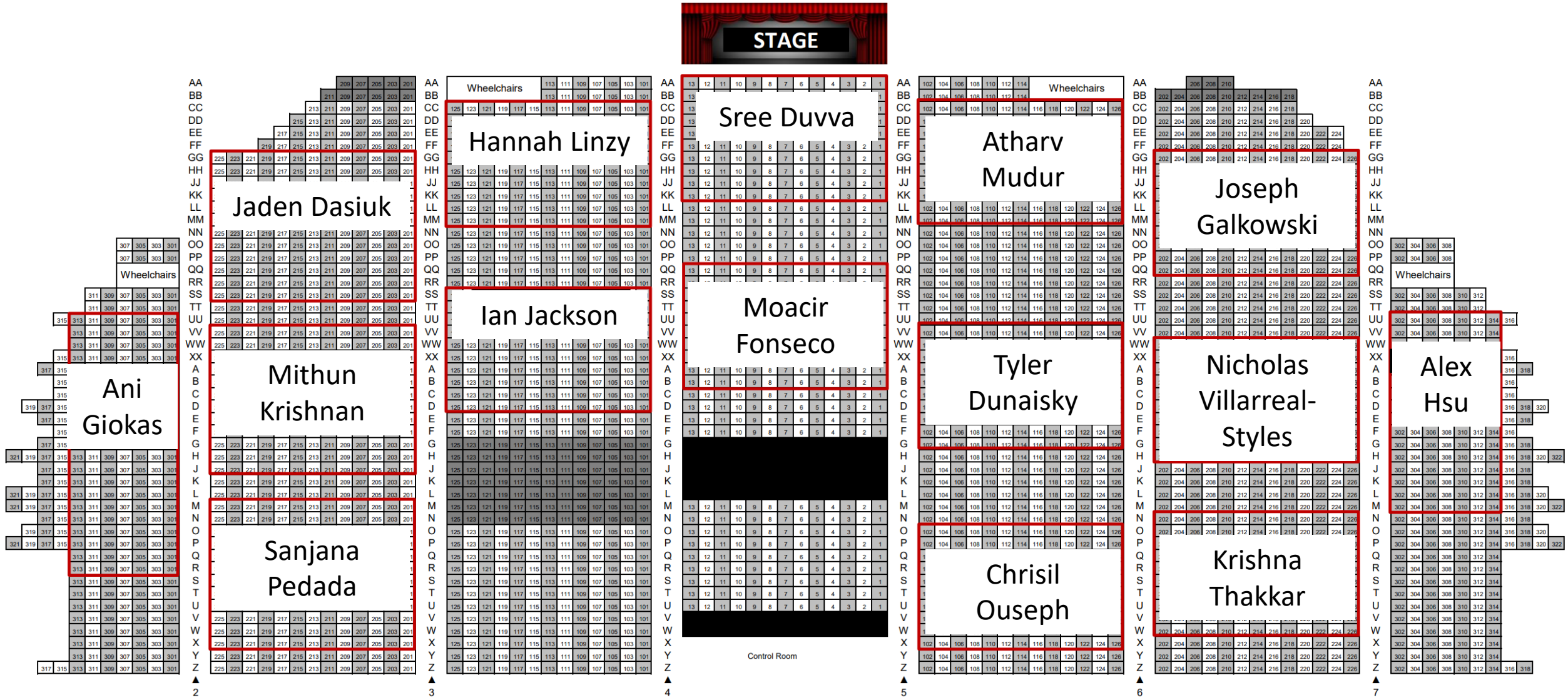


Row	LL
Seat	11
Door	4

MA 16100
Exam 3

Elliot Hall Main Floor ELLT 116
3387 stations
Exam Capacity 1825 stations (shown shaded)
No seating center section rows G,H,J,K,L,M,N,V,W

Tuesday, November 15, 2022
6:30 - 7:30 p.m.



4. WHAT IS THE EXAM FORMAT?

- Face-to-face and multiple-choice
- 12 Questions worth 8 points each
  - Total = 12 x 8 + 4 = 100
  - (4 points for filling out scantron correctly)
- Exam 3 covers Lessons 20-30
  - from Maxima & Minima to Approximating Areas Under Curves.
- Question order will be random

5. HOW MANY VERSIONS?

- There will be 9 versions of the exam
- To be graded correctly, you need to fill out the Test Number on your Scantron:

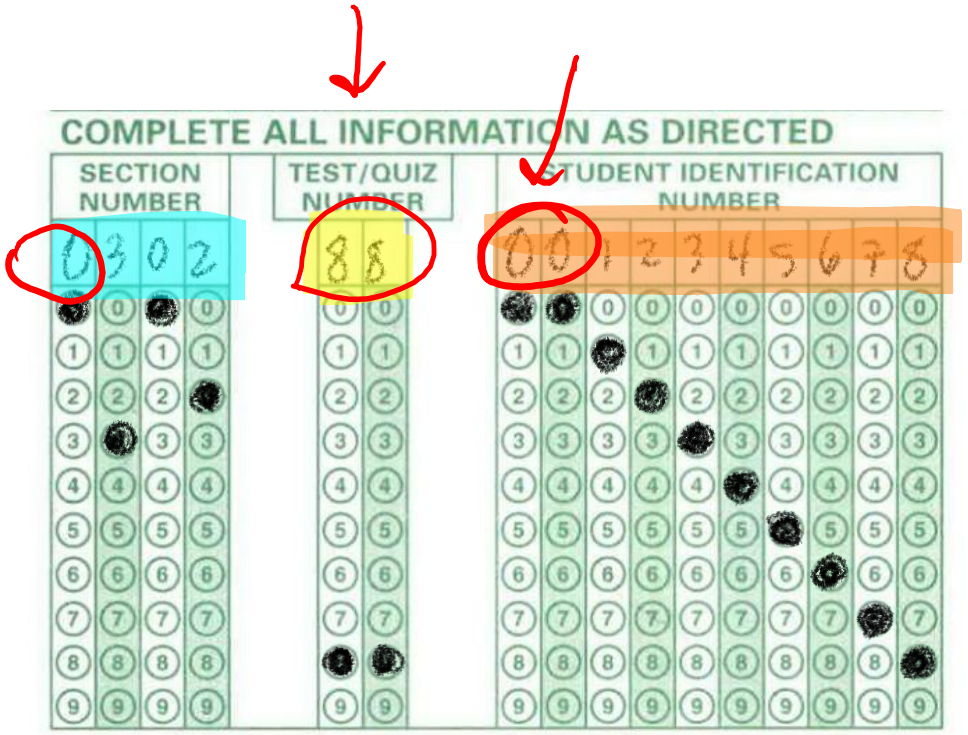
MA 16100
EXAM 2 - 10/18/2022
TEST/QUIZ NUMBER:
88

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION TIME _____

You must use a #2 pencil on the scantron answer sheet. Fill in the following on your scantron and blacken the bubbles

1. Your name. If there aren't enough space for your name, fill in as much as you can.
2. Section number with a leading zero, e.g. 0302. (If you don't know your section number, ask your TA.)
3. Test/Quiz number: 88
4. Student Identification Number: This is your Purdue ID number with two leading zeros
5. Blacken in your choice of the correct answer on the scantron answer sheet for questions 1–12.



6. RULES FOR ARRIVING LATE

Timer: Timer starts at 60 minutes and counts down	Late Arrivals: Can students who arrive to the exam late take the exam?	Leaving Early: Can students who finish the exam leave early?
60 min – 40 min	Yes	No
40 min – 10 min	No*	Yes
10 min – 0 min	No*	No

- Students who arrive after the first 20 minutes must talk to Dr. Hood to arrange for an alternate exam with a 20% late penalty

1. Compute the limit. $\lim_{x \to \pi} \dfrac{\sin(x - \pi)}{x^2 + 4\pi x - 5\pi^2}$

A. $\dfrac{1}{6\pi}$

B. $\dfrac{1}{2\pi}$

C. $-\dfrac{1}{2\pi}$

D. 0

E. $-\dfrac{1}{4\pi}$

2. Compute the limit. $\lim_{x \to 0} (1 - 2x)^{1/x}$

A. e^2

B. 1

C. -2

D. 2

E. e^{-2}

4. Using differentials (linear approximation) to estimate $\sqrt{9.1}$, the approximate value is

A. $3\frac{1}{30}$

B. 3.01

C. $3\frac{1}{6}$

D. $3\frac{1}{60}$

E. 3.033

5. You are the owner of a rectangular orchard adjacent to a straight river. You have 1000 ft of fence that you want to use to enclose it. No fencing is required along the river. If x is the length of a side perpendicular to the river and y is the length of the side parallel to the river, find the values of x and y that will maximize the enclosed area.

A. $x = 400,\ y = 200$

B. $x = 250,\ y = 500$

C. $x = 200,\ y = 600$

D. $x = 250,\ y = 750$

E. None of the above

6. Let f be a function whose derivative is given by

$$f'(x) = (x-1)(x+3)(x-4).$$

The function f has

A. Local maxima at $x = -3$ and $x = 1$ and a local minimum at $x = 4$.

B. Local maxima at $x = 1$ and $x = 4$ and a local minimum at $x = -3$.

C. Local maxima at $x = -3$ and $x = 4$ and a local minimum at $x = 1$.

D. A local maximum at $x = 4$ and local minima at $x = -3$ and $x = 1$.

E. A local maximum at $x = 1$ and local minima at $x = -3$ and $x = 4$.

7. On the open interval $(2, 3)$, the function $f(x) = x^3 - 6x^2 + 9x + 30$ is

A. Increasing and concave up

B. Decreasing and concave down

C. Increasing and concave down

D. Decreasing and concave up

E. None of the above are true for the entire interval

8. Find the point of inflection of the function

$$f(x) = \frac{\ln x}{x}$$

A. $\left(e^{1/2}, \dfrac{1}{2e^{1/2}}\right)$

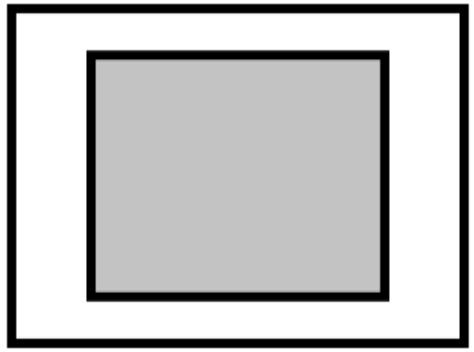
B. $\left(e^{3/2}, \dfrac{3}{2e^{3/2}}\right)$

C. $(1, 0)$

D. $\left(e, \dfrac{1}{e}\right)$

E. $\left(e^{3}, \dfrac{3}{e^{3}}\right)$

9. The top and bottom margins of a poster are each 1 inch and the side margins are each 2 inches. If the area of printed material on the poster is fixed at 32 square inches, find the smallest possible area of the entire poster.



A. 72 square inches

B. 80 square inches

C. 64 square inches

D. 96 square inches

E. 76 square inches

10. Consider the function $f(x) = x^{2/3}$ restricted to the domain $[-1, 1]$. Which one of the following statements is FALSE?

A. On the domain $[-1, 1]$, f attains an absolute minimum value.

B. $x = 0$ is a critical number for f.

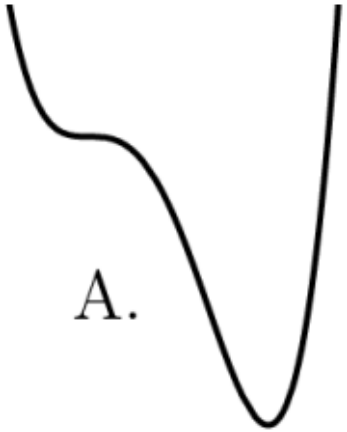
C. $f(x) \leq 1$ on the domain $[-1, 1]$.

D. There exists a c between 0 and 1 where $f'(c) = 1$.

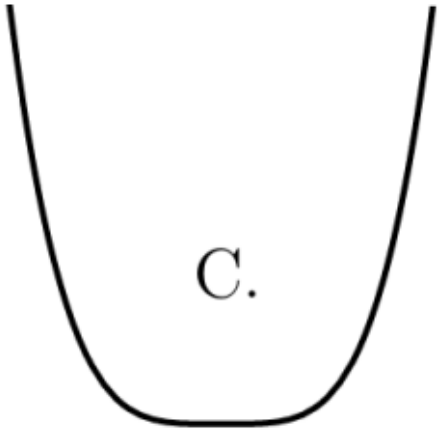
E. Since $f(-1) = f(1)$, there exists a c between -1 and 1 where $f'(c) = 0$.

12. Find the shape of the graph of $y = 3x^4 - 8x^3$.

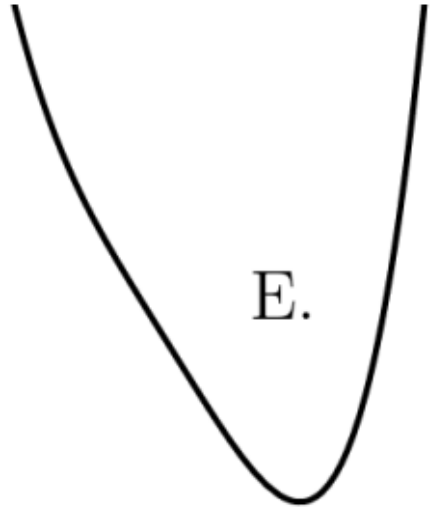
A.



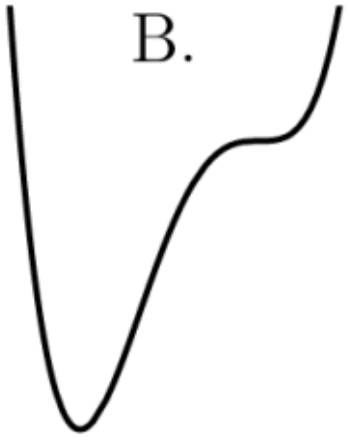
C.



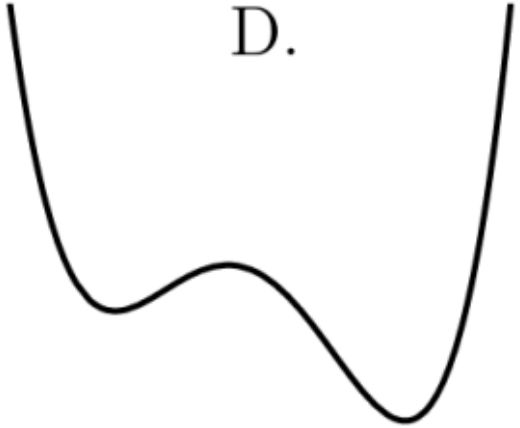
E.



B.



D.



20. Find an antiderivative of the function $f(x) = \dfrac{(x-1)^2}{x}$

A. $\dfrac{2(x-1)^3}{3x^2}$

B. $\dfrac{x^2-1}{x^2}$

C. $\dfrac{1}{2}x^2 - 2x + \ln|x|$

D. $\dfrac{x(x-1)^3}{3}$

E. $\dfrac{(x-1)^2(2x+1)}{6}$

21. Estimate the area under the graph of $f(x) = \sin(x)$ from $x = 0$ to $x = \dfrac{\pi}{2}$ using three approximating rectangles and left endpoints. In other words, find the left Riemann sum, L_3.

A. $\dfrac{\pi(3+\sqrt{3})}{12}$

B. $\dfrac{\pi(3+\sqrt{3})}{2}$

C. $\dfrac{\pi(1+\sqrt{3})}{12}$

D. $\dfrac{\pi(1+\sqrt{3})}{4}$

E. $\dfrac{\pi(3+\sqrt{3})}{4}$