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

00

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: **00**

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.

There are **12** questions, each worth 8 points (you will earn 4 points for filling out your scantron correctly). Do all your work in this exam booklet. Use the back of the test pages for scrap paper. Turn in both the scantron and the exam booklet when you are finished.

If you finish the exam before 7:20, you may leave the room after turning in the scantron sheet and the exam booklet. You may not leave the room before 6:50. If you don't finish before 7:20, you MUST REMAIN SEATED until your TA comes and collects your scantron sheet and your exam booklet.

EXAM POLICIES

1. Students may not open the exam booklet until instructed to do so.

2. Students must obey the orders and requests by all proctors, TAs, and lecturers.

3. No student may leave in the first 20 min or in the last 10 min of the exam.

4. Books, notes, calculators, or any electronic devices are not allowed on the exam, and they should not even be in sight in the exam room. Students may not look at anybody else's test, and may not communicate with anybody else except, if they have a question, with their TA or lecturer.

5. After time is called, students must put down all writing instruments and remain in their seats, while the TAs will collect the scantrons and the exams.

6. Any violation of these rules and any act of academic dishonesty may result in severe penalties. Additionally, all violators will be reported to the Office of the Dean of Students.

I have read and understand the exam rules stated above:

STUDENT SIGNATURE: ———————————————————————

1. Suppose a stone is thrown vertically upward with an initial velocity of 64ft/s from a height of 32 ft above the ground. The height (in ft) of the stone above the ground t seconds after it is thrown is $s(t) = 32 + 64t - 16t^2$.

What is the height (in ft) of the stone at it's highest point?

    A. 2 ft

    B. 96 ft

    C. 128 ft

    D. 64 ft

    E. $(2 + \sqrt{6})$ ft

2. Suppose $f(x) = xe^{-x}$. If M is the absolute maximum of f on the interval $[0, 2]$ and m is the absolute minimum on the same interval, what is the sum $M + m$?

    A. 1

    B. 2

    C. $\dfrac{2}{e^2}$

    D. $\dfrac{1}{e}$

    E. $\dfrac{2 + e}{e^2}$

3. Evaluate $\displaystyle\lim_{x\to 2}\frac{\sin(x-2)}{x^2-4}$

    A. 0

    B. 2

    C. ∞

    D. $\dfrac{1}{4}$

    E. 1

4. A 5-ft ladder is leaning against a vertical wall when Jack begins pulling the foot of the ladder away from the wall at a rate of 0.5 ft/s. How fast is the top of the ladder sliding down the wall when the foot of the ladder is 4 ft from the wall?

    A. $-\dfrac{3}{4}$ ft/s

    B. $-\dfrac{4}{3}$ ft/s

    C. $-\dfrac{2}{3}$ ft/s

    D. $-\dfrac{3}{8}$ ft/s

    E. $-\dfrac{1}{3}$ ft/s

5. Find the slope of the line tangent to the curve $y = x \tan^{-1}(x)$ at the point $(1, \frac{\pi}{4})$.

A. $\dfrac{\pi}{4} + 1$

B. $\dfrac{\pi}{4} + \dfrac{1}{2}$

C. $\dfrac{3\pi}{4}$

D. $\dfrac{1}{2}$

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

6. Let $f(x) = \ln\left(\dfrac{2x + 1}{x - 1}\right)$. Find $f'(2)$.
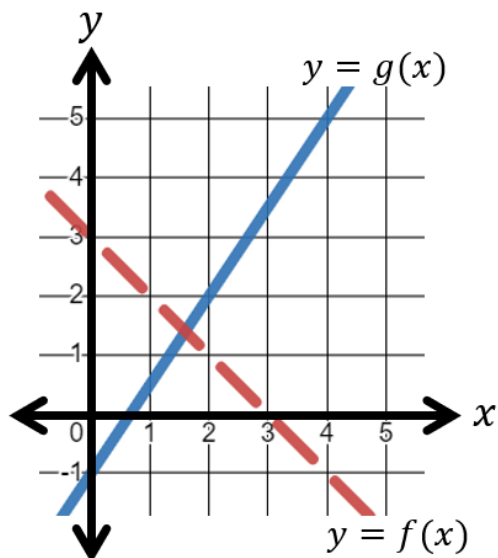
A. $\dfrac{7}{5}$

B. $\dfrac{2}{5}$

C. $-\dfrac{3}{5}$

D. $-\dfrac{4}{5}$

E. $\dfrac{1}{5}$

7. Let $H(x) = f(x) + 4g(x)$, where the graph of $f(x)$ and $g(x)$ are shown in the picture. Find $H'(2)$.

A. 6

B. 9

C. $-\dfrac{5}{2}$

D. 5

E. 7

8. Let $f(x) = e^{\tan(3x)}$. Find $f'(0)$.

A. 3

B. $3e$

C. ∞

D. $f(x)$ is not differentiable at $x = 0$.

E. 1

9. Let $f(x) = \dfrac{8x}{e^x + x^2}$. Calculate $f'(0)$.

    A. $-\dfrac{8}{(e+1)^2}$

    B. $-\dfrac{8}{e}$

    C. 16

    D. 8

    E. $\dfrac{8e-8}{(e+1)^2}$

10. Find the slope of the curve $2\cos(xy) = y^2 - 1$ at the point $\left(\frac{\pi}{2}, 1\right)$.

    A. $-\dfrac{1}{2}$

    B. $-\dfrac{2}{\pi + 2}$

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

    D. 0

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

11. If $f(x) = x^{\sin(x)}$, find $f'(\frac{\pi}{2})$.

    A. 1

    B. $2\ln(\pi)$

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

    D. $\ln(\pi) - \ln(2)$

    E. $\dfrac{\pi}{2}$

12. A particle moves along the graph of $y = \sqrt{8 + x^2}$. As it reaches the point $(1, 3)$, the y coordinate is increasing at a rate of 6 units/sec. How fast is the x coordinate of the point increasing at that instant?

    A. 36 units/sec

    B. 2 units/sec

    C. 3 units/sec

    D. 18 units/sec

    E. $\dfrac{1}{3}$ units/sec