PASS
PEER ASSISTED STUDY SESSIONS

MOCK EXAM
FOR PRACTICE ONLY

COURSE: MATH 1007 **FACILITATOR:** Eric Paterson

It is **most beneficial** to you to write this mock midterm **UNDER EXAM CONDITIONS**. This means:

- Complete the midterm in 3 hours.
- Work on your own.
- Keep your notes and textbook closed.
- Attempt every question.

After the time limit, go back over your work with a different colour or on a separate piece of paper and try to do the questions you are unsure of. Record your ideas in the margins to remind yourself of what you were thinking when you take it up at PASS.

The purpose of this mock exam is to give you practice answering questions in a timed setting and to help you to gauge which aspects of the course content you know well and which are in need of further development and review. Use this mock exam as a ***learning tool*** in preparing for the actual exam.

Please note:

- Come to the PASS workshop with your mock exam complete. During the workshop you can work with other students to review your work.
- Often, there is not enough time to review the entire exam in the PASS workshop. Decide which questions you most want to review – the Facilitator may ask students to vote on which questions they want to discuss in detail.
- Facilitators do not bring copies of the mock exam to the session. Please print out and complete the exam before you attend.
- **Facilitators do not produce or distribute an answer key for mock exams.** Facilitators help students to work together to compare and assess the answers they have. If you are not able to attend the PASS workshop, you can work alone or with others in the class.

Good Luck writing the Mock Exam!!

Dates and locations of mock exam take-up:

Friday Dec. 9th, 7:00-9:00pm, SA 416

Saturday Dec. 10th, 4:00-6:00pm, ME 3380

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Part 1

a.) Determine the domain of the following function:

$$y = \frac{\ln(3x - 2)}{x - 1}$$

b.) Evaluate:

$$\sin^{-1}\frac{-\sqrt{3}}{2}$$

c.) Simplify the following:

$$\frac{\frac{a}{b} - \frac{b}{a}}{\frac{1}{b} - \frac{1}{a}}$$

d.) Evaluate

$$\csc(\pi/3)$$

e.) Evaluate

$$\lim_{x\to 3} \frac{\sin(x-3)}{3x-9}$$

f.) Evaluate:

$$\lim_{x\to \infty} e^{\frac{1}{x}}$$

g.) Determine $\frac{dy}{dx}$

$$y = \frac{1}{4}\sin^{-1}(2x)$$

h.) Determine the following limit

$$\lim_{x\to\infty} \tan^{-1}(x)$$

i.) Evaluate the following integral

$$\int 2\sec^2 x\, dx$$

j.) Evaluate the following definite integral

$$\int_0^2 x^2 - 3\, dx$$

Part 2

1. Determine the inverse of the following function:

$$f(x) = y = \sqrt[3]{(\frac{1}{2} + 3x^{-1})} - 2$$

2. Evaluate the following limits.

a. $\lim_{x \to -\infty} \frac{x^3 - 2x^2 + 1}{3x - 1}$

b. $\lim_{x \to -2} \frac{x^2 + 5x + 6}{x^2 - 2x - 8}$

c. $\lim_{x\to 0} \frac{\sqrt{x^2+16}-4}{x^2}$

d. $\lim_{x\to 0} \frac{1-\cos(x)}{x^2}$

3. Determine the equation of the tangent line at the point (1,1)

$$y^2 - 3xy = \sqrt{y} - 6x^3 + \frac{1}{y} + 2$$

4. Differentiate the following functions:
   a. $f(x) = \frac{\sin(cosx)}{2}$

   b. $f(x) = \frac{\ln(3x^2)}{2x}$

   c. $f(x) = e^{2x-3} + \frac{x}{2}$

   d. $f(x) = \sqrt{\tan(2x)}$

e. $f(x) = \sqrt{\sin(3x)}$

f. $y = x^{e^x}$

5. Let h(x)=f(g(x)). If f(4)=7, f'(4)=8, f'(5)=3, g(2)=4. And g'(2)=6, determine h'(2)

6. Determine the linearization of the following function at x=4, and use it to estimate the value of f at 4.01

$$f(x) = y = \sqrt{x+5}$$

7. Given the following function, defined on the interval (-0.5,0.75):

$$y = f(x) = 4x^4 - 3x^3$$

a.) Determine the critical points

b.) Determine the intervals of increase and decrease

c.) Determine the absolute min and max of the above function on the defined interval.

8. Sketch the curve of the following function, given the information below:

$$f(x) = \frac{x^2 - 1}{2x^2 - 8}$$

$D = (-\infty, -2) \cup (-2,2) \cup (2, \infty)$

Intercepts: (0,0.125), (−1, 0), and (1, 0)

Critical points $x = 0$

f is increasing on (−∞, −2) and (−2,0);

decreasing on (0,2) and (2, ∞)

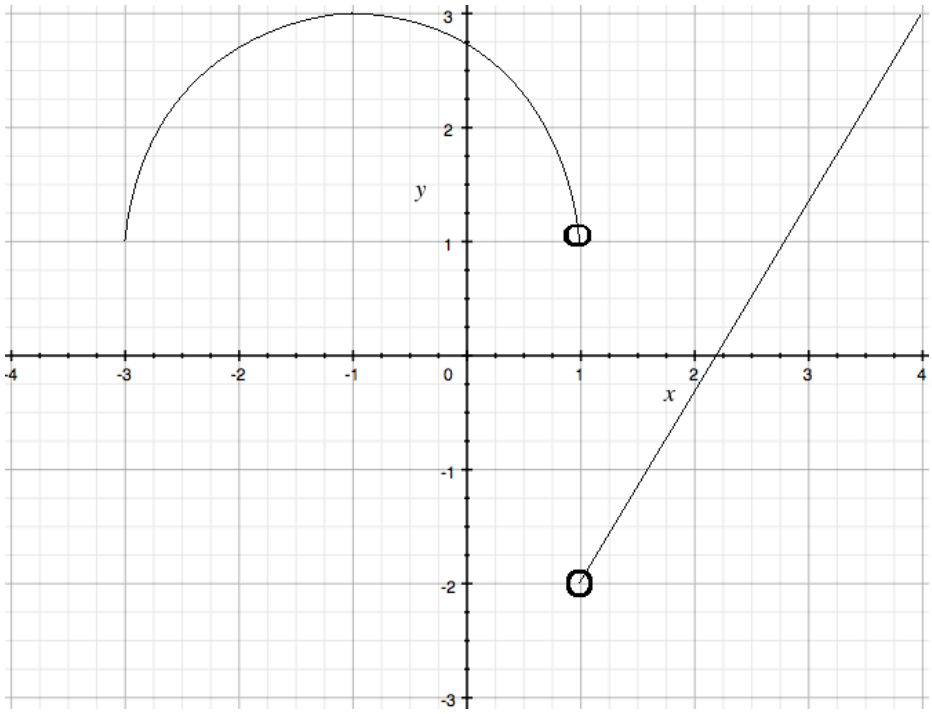
f is concave up (−∞, −2) and (2, ∞);

concave down on (−2,2)

Vertical asymptotes: x=2 and x=-2;

horizontal asymptotes: y = 0.5

9. The graph below shows the derivative, f'(x), of some continuous function f, defined on [-3, 4]



a.) Determine the critical points, intervals of increase and decrease, and intervals of concavity of f(x).

10. Determine the area of the closed region bounded by the curves $y = 2x^2 + 10$ and $y = 4x + 16$

11. Evaluate the following indefinite integrals

a.) $\int 2\sin(4x) - \frac{2}{x} + 3e^x + \frac{1}{\sqrt{1-x^2}} + \frac{x^2}{3}\, dx$

b.) $\int \frac{(2x+3)^2}{\sqrt{x}}$ dx

12. Find a function f(x) such that f'(x)= $6x^2 - \frac{2}{x} + \cos(2x)$ and f(0)=4