

Calculus Placement Survey

Purpose of this survey

This survey is for students who have taken some calculus, but are unsure if they have enough preparation to move beyond Calculus I (MATH 0121) and enroll in Calculus II (MATH 0122). This is a self-administered survey to help students determine which course might be best for them. Once this survey is complete, students will need to either seek permission to enroll in Calculus I (MATH 0121), enroll directly in Calculus II (MATH 0122) as no permission is required, or consult further via mathplacement@middlebury.edu.

Instructions

Do as much as you can on each of the following exercises.

- There is no time limit- feel free to take breaks in the middle.
- Feel free to look up formulas or facts, unless the question specifies otherwise. Don't try to teach yourself a new topic you have never seen before, but if this information is not right at the forefront of your mind, go find it. This isn't an exam.

As you go, mark each exercise as Green, Yellow, or Red

- Green indicates you confidently found the answer. You should actually find the answer.
- Yellow indicates you think you could answer this question after some review. You've seen this before but don't remember all the details.
- Red indicates you have never seen questions of this type before and don't know how to proceed.

Take notes on a separate sheet of paper as you attempt each exercise. Be as organized as you can. If you end up meeting with a faculty member to consult on the results of this survey, they may want to see how you attempted each question.

Using this process, try Part A below:

Part A

1. Find the solutions (if any) to each of the following equations.

a. $x^3 - 7x^2 - 8x = 0$

b. $0 = 1 + 2 \cos(x)$ (Find values of x between 0 and 2π)

c. $\frac{x+3}{x-4} = 0$

2. Evaluate the following without a calculator:

a. e^0

b. $\ln(1)$

c. $\sin(0)$

d. $\cos(0)$

3. Find the derivative of $f(x) = 3x^5 - \frac{10}{x^2} - x^{\frac{3}{2}} + 7$

4. Find the derivative of $f(x) = \sqrt{x^2 + 1}$

5. Evaluate each limit on the left below and match it with a value on the right

a. $\lim_{x \rightarrow \infty} \frac{3x^3 - 8x + 5}{4x^4 + 2x - 7}$	$\frac{3}{4}$
b. $\lim_{x \rightarrow \infty} \frac{3x^3 - 8x + 5}{4x^3 + 2x - 7}$	∞
c. $\lim_{x \rightarrow \infty} \frac{3x^3 - 8x + 5}{4x^2 + 2x - 7}$	0

6. Evaluate

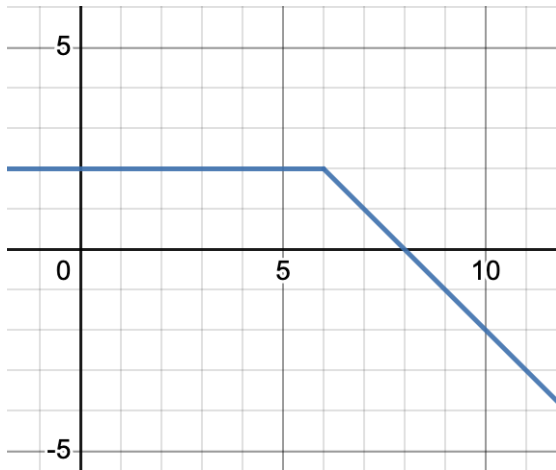
$$\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$$

7. Sketch the graph of $f(x) = x^3 - 3x$ without a calculator. Indicate local maxima and/or minima and inflection points. On what interval(s) is the function decreasing?

8. Evaluate $\int x^3 - 2\sqrt{x} dx$

9. Evaluate $\int e^{5x} dx$

10. Here is a graph of $y = f(x)$:



Choose the correct value for

$$\int_0^{10} f(x) dx$$

- a) 15 b) 12 c) 2 d) 6

Instructions (Continued):

Count up how many problems you marked as red above.

- If you marked more than 2 out of 10 as red, you should seek permission to enroll in Calculus I (MATH 0121). Fill out the Calculus I Pre-approval Google Form (<https://forms.gle/nwZ7ELmNimVGP6qy8>).
- If you marked the majority of the problems in part A as green or yellow, you should proceed to Part B.

Part B

1. Find the derivative of $f(x) = \cos(\sqrt{3x^2 + 2})$

2. Find the derivative of $f(x) = x^2(3x + 4)^5$

3. Find $\frac{dy}{dx}$ given the equation $x^2 + 3xy + y^2 = 12$

4. Evaluate

$$\int x\sqrt{3x^2 + 5} dx$$

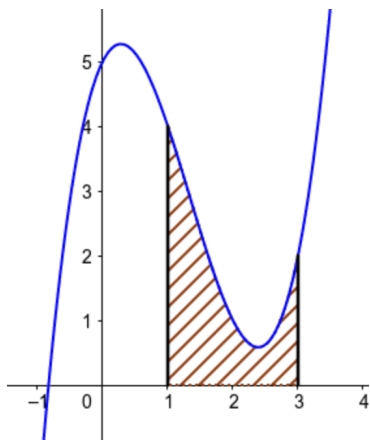
5. Evaluate

$$\int \sin^2(x) \cos(x) dx$$

6. Combine the two fractions together into one fraction

$$\frac{3x - 4}{x^2 - 9} - \frac{2x - 3}{x - 3}$$

7. Suppose that F is a function and the derivative of F is given by the function F' shown below. So this graph is the graph of the DERIVATIVE of F



Which expression below represents the shaded area?

- a. $\int_3^1 F(x) dx$
- b. $F(3) - F(1)$
- c. $\int_1^3 F(x) dx$
- d. $F(1) - F(3)$

Instructions (Final):

If you marked the majority of the problems in part B as yellow or green, you should enroll in Calculus II (MATH 0122). If you marked the majority of the problems in part B as red, you should consult with math faculty by emailing mathplacement@middlebury.edu